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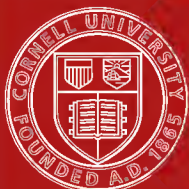
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THE
FIRST STEPS IN NUMBER.

BY

G. A. WENTWORTH, A.M.,
PROFESSOR OF MATHEMATICS IN PHILLIPS EXETER ACADEMY,

AND

E. M. REED,
PRINCIPAL OF TRAINING SCHOOL AT PLYMOUTH, N.H.



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PREFACE.

THE object of this book is to provide teachers with a record of the work done in number in the primary schools of to-day.

There has been no attempt at novelty in the subject-matter, in the arrangement of work, or in the manner of presentation. The whole is on a constructive basis. Numbers are chief; processes subordinate. What has been found to be more easily understood precedes the more difficult, without respect to its scientific relation. Fractions present no greater difficulty than wholes, so they accompany the teaching of integral numbers from the beginning. The law of dependence has been carefully observed, although at first glance the arrangement may not seem to warrant this assertion.

The object of every teacher is so to present numbers that the mind of the child may grasp firmly the facts concerning them, and hold these facts tenaciously by the law of association. Success lies in requiring the child to *show* what he is talking about, and in following the "step by step" rule. The book illustrates these two principles. It abounds in examples which have not before appeared in print, and which are calculated to interest the child from their close connection with his varied experiences. It gives suggestions for versatility of drill, and illustrates in detail the teaching of a hundred topics.

It is expected that the work to the number ten will be taken in one year, the work to twenty in another year, and the remainder of the course outlined in the book will be covered in two years more.

A child's book accompanies this edition, which the child may use with great advantage after he becomes acquainted with figures.

It is hoped that this book will find a welcome among all persons interested in leading children by easy and sure paths to a knowledge of numbers.

G. A. WENTWORTH.
E. M. REED.

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FIRST STEPS IN NUMBER.



CHAPTER I.

INTRODUCTION.

FOR a successful teaching of Number the teacher needs a great variety of objects. Blocks, splints, sticks, buttons, paper patterns, peas, beans, corn, spools, counters, shells, pebbles, horse-chestnuts, acorns, little tin plates, cups and saucers, tin money, are inexpensive and convenient to handle. For measurements, the teacher must have inch measures, foot rules, yard measures, a set of tin measures, a set of wooden or paste-board measures, a set of weights, and a pair of scales.

The teaching of Number as far as ten does not include the teaching of figures or other signs used in Arithmetic. No blackboard work is required of the child until after he has learned the numbers below ten. There is no difficulty in learning the figures along with the numbers; the difficulty comes in learning the numbers along with the figures. So it seems best to ignore the sign in favor of the thing.

It is more convenient in these exercises to have the children stand about a table on which are the objects to be handled, and many of the directions to the class are given with this arrangement in view. Let the children illustrate each story with objects, until it is evident that the relation between the numbers is as clearly seen without the objects as with them. Whenever a mental picture is formed, then the material is a hindrance to the teaching. Objects are a

means to an end, not the end. When an idea has been abstracted from the concrete, objects no longer have an office to perform, and should be put aside.

Ascertain the child's knowledge of Number before attempting any teaching of Number. Do this by skilful examination after the child feels at home in the school-room.

"Show me so many blocks (two blocks); so many beans; so many pebbles; so many spools; so many pencils."

"How many blocks have I in my hand? Come, whisper to me, if you know."

After each has whispered the number, ask the class:

"How many spools did you show me? how many beans? how many blocks?"

Let the class answer in concert, "Two," each time.

"Show me two buttons; two boys; two girls; two chairs."

"Put two blocks on the table in front of you; put two buttons on the table; take one button from the table and put it under the table; put one block under the table."

If *two* be known, try *three*, and so on until a number is reached which is not known.

Second step in the examination:

Require the child to show some number with which he is familiar. For example, *two*.

"Take one of your two blocks away. How many blocks have you left?"

"If I have two horses and sell one horse, how many horses shall I then have?"

"If I have two pencils and lose one pencil, how many pencils have I left?"

"You may put one block on the table in front of you. You may put another block with it. How many blocks have you now shown me?"

"One block and one block are how many blocks?"

"One horse and one horse are how many horses?"

"If I have one pencil and buy another, how many pencils shall I have?"

"If John has one cent and I give him another cent, how many cents will he have?"

"If Susie has one apron and mamma makes her another, how many aprons will Susie have?"

"Show me two buttons. Take the two buttons away. How many buttons remain?"

"If there are two cows in the barn and two cows are turned out in the yard, how many cows remain in the barn?"

"Show me two boxes. Put one block in each box. How many blocks does it take?"

"If these two little girls have each a doll, how many dolls have they together?"

"If these two little boys have each a sled, how many sleds have they together?"

"If there are two nests, and an egg in each nest, how many eggs are there?"

"If there are two stores, and a wagon at each store, how many wagons are there?"

"Show me two blocks. Put one of these two blocks in this box. Put another of your blocks in this box. How many boxes does it take?"

"If you have two hens, and each sits in a nest by herself, how many nests will it take?"

"If you have two spoons, and put each into a cup by itself, how many cups will it take?"

"If you have two cents, and give one each Sunday, how many Sundays can you give before the two cents will be given away?"

"If you have two pencils, and put each on a slate by itself, on how many slates will you put them?"

This outline for review is merely suggested as being searching in its nature. The aim should be solely to bring to light all the child's knowledge of Number, that the teacher may waste no time upon teaching him what he already knows. Do not hurry the examination. See that each child does for himself what you require, and does not imitate you or his neighbor in his work. Let each one answer for himself. Distinguish between the child's failure to understand your language and his inability to do what you require of him.

When the examination is complete, begin the teaching, and take the child where he is. As far as the experience of most primary teachers goes, few children know beyond *two* when they enter school for the first time. In most instances *three* will be the starting-point in teaching.

The ability to count up to a number does not constitute a knowledge of the number; so this must not be taken as the test of the child's knowledge. Do not permit counting by ones throughout the work in Arithmetic.

In the teaching of every number the order to be observed is as follows:

- I. The perception of the number.
- II. Analysis of the number.
- III. Drill upon facts discovered by analysis.
- IV. Comparison with smaller numbers.

CHAPTER II.

THE NUMBER THREE.

§ 1. THREE AS A WHOLE.

SHOW me two blocks. Put one more block with them.

Show me just as many spools; just as many pebbles; as many buttons; as many pencils; as many marks on the board; as many fingers.

You have shown me *three* fingers.

Show me three marks you have made on the board; three spools; three pencils; three pebbles; three shells; three little girls; three boys; three blocks.

How many blocks have you shown me? How many spools? How many splints? How many buttons?

I have a block, a spool, and a nut. How many things?

I have a box, a pen, and a stick. How many things?

Show me a button, a nut, and a shell. How many things have you shown me?

Show me three other things. Go to your desk and bring me three things.

Who thinks he has seen three men on the street? three boys playing ball? three houses in a row? three horses drawing a load? three street cars in a row? three people in a carriage? three things in the shop window?

Name three things you saw on your way to school; three things you had for breakfast; three things you can do; three things you can wear; three things you own; three persons you know.

§ 2. DISCOVERIES IN THREE.

You may take one block away from your three blocks. How many blocks have you left? What else can you take away from three blocks? How many blocks will remain? What other number can you take away? What will remain?

Who sees something else that can be done? I see Mary has put hers in two groups. How many in this group? (Two.) How many in this? (One.) What did Mary find in three? (Two blocks and one block.)

Who can find anything else?

§ 3. FACTS IN THREE.

Two and One.

You may each take two blocks. Take one more block. How many blocks are two blocks and one block?

Show me two shells. Show me one more shell. How many shells have you shown me?

Show me two beads and one bead. How many beads are two beads and one more bead?

Show me two pegs and one more peg. How many pegs have you shown me?

In these envelopes are pretty things. I will give each of you an envelope if you will try to take out just two things, and then one more. Mary, tell me about your dustpans. Henry, about your rakes. Annie, about your combs. John, about your knives. Nellie, about your birds.

We will call these beautiful red strips of paper sticks of candy. Who will tell me about two sticks of candy and one more stick of candy?

If you take two splints (let the child take the two splints) and one more splint (let this be taken also), how many splints have you? Tell me that story.

Mary, if you take two buttons and then take one more, how many buttons have you? Tell me a story about that.

Tell me a story about two shells and one shell; about two pencils and one pencil.

I am going to call my blocks horses. If I have two horses and buy one more horse, I shall have three horses.

REMARK. In telling a story, always handle the blocks so as to illustrate what is being said, and require the pupil to do the same.

What will you call your blocks? You may tell me the story that two kitties and one kitty are three kitties.

One and Two.

Show me one block. Show me two more blocks. How many blocks have you shown me?

Show me one wheel. Show me two more wheels. How many wheels are one wheel and two wheels?

If I have one beautiful butterfly, and find two more butterflies, how many butterflies shall I have?

How many owls are one owl and two owls?

If I have one shell and take two more shells, how many shells shall I have?

I will hold up one finger; now I will hold up two more fingers. How many fingers do I hold up?

I will take one piece of paper and then take two more pieces of paper. I shall then have three pieces of paper.

You may tell me a story like this with your blocks; with these buttons; with your fingers; with these nuts.

I will call my blocks birds. Here is one bird on a tree, and two more birds fly up on the same tree. Tell me how many birds are on the tree.

This is a dog running, and these are two little girls running after him. How many are running?

You may tell me a story about one and two. What will you call your blocks? Another story; another.

Tell me about one armful of wood and two armfuls of wood; one knife and two knives; one chair and two chairs; one tin horn and two tin horns; one whistle and two whistles; one paper-weight and two paper-weights.

If one child tells me a story about birds, and two others tell me stories about birds, how many tell me stories about birds?

If I write one word on the blackboard, and then write two more words on the blackboard, how many words do I write in all?

Daisy saw one dog on one side of the street this morning, and two more dogs the other side of the street. How many dogs did she see on the street?

On one twig is a white blossom and two pink blossoms. How many blossoms on the twig?

I have a woollen cap and two hats. How many things have I to wear on my head?

Three minus One.

Show me three blocks. Do as I do. (Teacher puts one of her three blocks away.) How many have you left?

How many did you take away?

Show me your three blocks again.

Take one block away. How many have you now?

Show me your three blocks again.

I have three blocks on the table. I will put one block under the table. How many blocks have I on the table?

You may tell me a story about this. You may tell me a story with the splints; with the spools; with the tin plates.

If I have three cows, and sell one, how many cows shall I have left?

If I have three beds to make, and make one, how many more beds shall I have to make?

If you have three cups to wipe, and wipe one, how many more cups will you have to wipe?

If you have three lines of *i*'s to write, and write one line, how many more lines must you write?

Three minus Two.

Take three blocks. Give me two of them. How many have you left?

How many did you give me? I will give you back the two blocks.

Put two of your blocks behind you? How many remain before you?

How many did you take away?

Show me your three blocks again.

If I have three blocks, and give you two of my blocks, I shall have one block left.

You may tell me the same kind of a story with these buttons; with these beads; with these cents; with these keys.

Go to the board and make three marks. Erase two marks. How many remain?

Hold up three fingers. Shut two of the fingers. How many fingers remain up?

If mamma has three pies to make, and makes two, how many more must she make?

If two of the three pies get burned, how many will not be burned?

If three boys are in a line, and two boys step out of the line, how many remain in the line?

If you have three cents, and buy peanuts with two cents, how many cents will you then have?

If three sleds are going down the hill, and two tip over, how many go down the hill?

If there are three chairs up to the table, and you set back two chairs, how many chairs will remain up to the table?

Exercise for Review.

If Jamie catches two mice one day and one mouse another day, how many mice will he catch in all?

I have in my hand a button, a stick, and a tin cent. How many things have I in my hand?

I have on my bureau a cologne-bottle, a pin-cushion, and a watch-stand. How many things have I on my bureau?

If I should put the watch-stand on the table, how many things would be left on the bureau?

If I should put the cologne-bottle on the mantel, how many things would remain on the bureau?

If I carried back the watch-case and cologne-bottle, how many things would there be on the bureau?

Our baby is two years old. How old will she be in a year?

Here are three boxes; if you put a block in each box, how many blocks will it take?

One boy and one boy are how many boys?

One chicken and one chicken are how many chickens?

One boy and one girl are how many persons?

Two kittens and a dog are how many animals?

A mouse comes into the room to find something to eat. A cat comes into the room to find what she can eat. How many animals are in the room? The cat and mouse both run into Mary's room, where she is sitting. How many are running then, do you think?

Three divided by One.

Show me three blocks.

Show me one of your three blocks.

Show me another of your three blocks:

How many have you shown me now?

Show me another of your three blocks.

How many one-blocks have you found in three blocks?

Take three buttons.

How many one-buttons can you find in three buttons?

Take three pencils.

How many one-pencils can you find in three pencils?

Mary may take three sticks, and give one to as many little girls as she has sticks for.

To how many little girls can she give them?

Take three buttons, and divide them in the same way. To how many can you give them? Three cents; three apples; three beads.

Take three books. Put each book on a desk by itself. How many desks does it take?

Take three pencils, and put each pencil on a slate by itself. How many slates does it take?

Here are three spools. Put each one on a book by itself. How many books does it take?

Take three splints, and put each one in a box by itself. How many boxes does it take?

Take three buttons, and put each in a box by itself. How many boxes does it take?

Take three erasers. Put each one at a board by itself. How many boards does it take?

Here are three little girls. Each one may go and sit at a desk by herself. How many desks does it take? How many chairs?

If there are three cups, and you put each in a saucer by itself, how many saucers will it take?

If you have three spoons, and put each one in a cup by itself, how many cups will have a spoon?

You may tell me a story like this about the spoons; another; another; another; another.

Three Ones.

Here are three baskets. You may put a kitty in each basket. How many kitties are in all the baskets?

Here are three nests. Put an egg in each nest, and tell me how many eggs it takes.

Here are three little girls. Give each a pencil, and tell me how many pencils it takes.

Here are three plates. Put an apple on each plate, and tell me how many apples it takes.

Here are three posts, with a horse at each post. How many horses do you see?

Show me three pens, with a pig in each pen. How many pigs do you show me?

Show me three lamp-posts, with one lamp on each post. How many lamps do you show me?

Show me three dustpans, with a brush in each pan, and tell me how many brushes you show me.

If each brush has a handle, how many handles do three brushes have?

How many noses do three little boys have?

How many heads do three pins have?

How many handles do three pitchers have?

You may show me three boxes, with a button in each box. How many buttons do you show me?

You may show me three pieces of paper, with a pin in each paper. How many pins do you show me?

Show me three hats. How many bands on each hat? How many bands on the three hats together?

Show me three boys, each with a hat on his head. How many hats does it take for the three boys?

If I have three boxes, and a block in each box, how many blocks shall I have?

If I have three books, and each book has a picture in it, how many pictures shall I have to look at?

If these three boys each give me a cent, how many cents shall I have?

If there are three nests, and an egg in each nest, how many eggs are there?

If there are three stalls, and a horse in each stall, how many horses are there?

If there are three slates, and a pencil on each slate, how many pencils are there?

If there is a bed in each room, how many beds will there be in three rooms?

If there is a candle in each candle-stick, how many candles in three candle-sticks?

Exercise for Review.

Charlie has two marbles and a kite. How many things has he?

Nellie has a kitten and two dolls. How many things has she?

Jamie bought three pencils this morning, but has broken one already. How many whole pencils has he?

There were three blossoms on this twig, but two have fallen off. How many are left?

There are three desks, with a pencil on each desk. How many pencils are there?

Here are three boys, each with an apple. How many apples are there?

Tom had three oranges, but gave one to each of his two little brothers. How many oranges had he then?

Two boys and one boy are how many boys?

One girl and two girls are how many girls?

Three cents minus two cents are how many cents?

Three blocks minus one block are how many blocks?

Three minus Three.

Show me three marks on the board? Erase the three marks. How many remain?

Show me three pieces of crayon. Give me the three pieces of crayon. How many pieces have you?

Here are three buttons. Put them in your pocket. How many buttons do you see now?

Here are three kittens asleep. Wake the three kittens. How many are asleep now?

If you have three balls, and lose three, how many balls will you have left?

Tell me that story with these spools; these pictures; these pencils; these counters; these beans; these splints; these shells.

If there are three doves on the roof, and the three doves fly down on the ground, how many doves are on the roof then?

If there are three sticks of wood in the wood-box, and you put three sticks of wood in the stove, how many sticks remain in the box?

If there are three plums on your plate, and you eat the three plums, how many plums remain on your plate?

Tell me a story about three cents minus three cents; three knives minus three knives; three chairs minus three chairs; three quarts of berries minus three quarts of berries; three kittens minus three kittens; three leaves minus three leaves.

§4. COMPARISON OF THREE WITH NUMBERS KNOWN.

Take two blocks. How many more must you take to have three blocks?

Take two buttons. How many more must you take to have three buttons?

If you have two sticks of candy, how many sticks of candy must I give you that you may have three sticks?

If you jump twice, how many more times must you jump to jump three times?

Take one block. How many more must you take to have three blocks?

If I have three cents, and you have one, how many more have I than you?

Annie has one doll; Mary has three dolls. How many more dolls has Mary than Annie?

Jamie has one pencil; I have three pencils. How many more pencils have I than Jamie?

Harry has three words to copy; he has copied one. How many more words has he to copy?

I have a three-pint pail. If there is one pint of berries in it, how many more pints of berries can I put in it before it is full?

Show me one block. Show me, just below the one block, two blocks. Show me three blocks just below these.

Which row has the most blocks?

Which row has the least blocks?

How many more in the middle row than in the first row?

How many less than in the last row?

How many more in the three-row than in the one-row?
than in the two-row?

How many less in the one-row than in the two-row?
than in the three-row?

Exercise for Review.

Lay down one counter and one block. How many things have you laid down?

Lift up your foot three times.

How many cups at tea-time must be put out for you and me? Show me with these cups.

Take three steps forward.

Take two steps backward.

How many joints has your thumb? your forefinger?

I have put one cent on the table. Put enough with it to make three cents.

Nod your head twice and then once; how many times have you nodded it?

Shut your hand; open one finger; another finger. How many fingers have you now open? Open enough more to make three.

Show me three legs of a chair.

Hold out three fingers.

Show me two shells; now show me another. How many shells have you shown me?

Say "one" for each shell you have shown me.

Tap the table once; again; again. How many times have you tapped it?

How many hands have you?

How many eyes have you? ears? elbows?

Show me your wrists. How many have you?

Show me your cheeks. How many have you?

Show me your feet. How many have you?

Tell me two things you can do.

Tell me two things you did this morning; two things you saw coming to school.

Tell me two kinds of food you ate for breakfast; two things you always put on the table when you set it.

Show me two apples; put one in the drawer. How many apples are left?

Tell me a story about *two*; another; another; another; another; another.

You may copy the word **two** on your slate.

How many mouths have you? how many chins?

How many heads have you?

How many heads have two little boys?

How many tongues have two little boys?

If two little girls have each an apple, how many apples have both together?

If I had three pieces of pie, and should put each piece on a plate by itself, how many plates would it take?

If there are three of you at the table, and I give each of you a saucer of strawberries, how many saucers of strawberries will it take?

If I should give each of three little girls a flower, how many flowers would it take?

If I have a knife, a pencil, and a key in my pocket, how many things have I in my pocket?

How many children are two girls and one boy?

If one of these children should run away, how many would remain?

If one more should go home, how many would be left?

If I have three nuts, and eat three nuts, how many nuts shall I have?

Tell me a story about this; another; another; another; another; another.

If three birds have each a worm, how many worms have the birds together?

I have here two buttons. If I put one on a sleeve by itself, how many sleeves can I put them on?

Put a pencil on each of these slates (three). How many pencils does it take?

If you make a mark on your slate for each door in this room, how many marks will you make?

If you make a mark for each door in your room at home, how many marks must you make?

If you make a mark for each chair in your room, how many marks will you make?

Mary, you may make a mark on your slate for yourself and your little brother. How many are yourself and little brother? How many marks, then, will you make?

At home, I have two boxes on the top of my bureau, and a comb in each box; how many combs are there?

Clapp your hands twice, then once. How many times have you clapped your hands?

Three kittens are how many more than one kitten?

Three kittens are how many more than two kittens?

One duck and two ducks are how many ducks?

Two dogs are how many more than one dog?

Two chickens and one chicken are how many chickens?

A bird has how many wings? how many eyes? how many feet? how many tails?

If you have a knife, a fork, and a spoon, how many things have you?

How many more things are a knife and a fork than two spoons.

Write:

•

one.

• •

two.

• • •

three.

CHAPTER III.

THE NUMBER FOUR.

§ 5. FOUR AS A WHOLE.

Show me three fingers; open another finger.

Look at the number of fingers you have shown me.

Show me as many children; as many chairs; as many books; as many buttons; as many pieces of paper.

Here are four pieces of paper.

How many pieces of paper did you show me?

How many fingers do I show you? how many blocks?

Show me four blocks; four marks on the board; four erasers; four balls; four keys; four pencils; four i's; four boxes.

How many thumbs are your thumbs and my thumbs?

How many forefingers are your forefingers and my forefingers?

How many ears have these two little boys?

How many joints have both your thumbs?

Give the names of four boys you know.

Name something that has four legs; something else; something else; something else; something else.

Where have you seen four houses? four thimbles? four horses? four teams?

Name four things you like to do.

Shut your eyes, and see if you can pick out four blocks.

Open your eyes; how many have you? Try again.

Copy the word **four**.

§ 6. DISCOVERIES IN FOUR.

See what you can find out about four things.

I see you have taken one away from your four; how many have you left?

You have shown me four minus two; how many have you left?

How many have you taken away? how many are left?

Harry has shown us something. All put your blocks like his. (In groups of two.)

Mary has shown us something. Put your blocks like Mary's. (In groups of one and three.)

Here are four boxes. You may see if you can use them all in holding your blocks. How many have you put in each?

Try the same with four buttons; four sticks; four pebbles; four things from the table.

Show me something else about four.

§ 7. FACTS IN FOUR.

Three and One.

Take three blocks. Take one more block. How many blocks have you?

Who will tell me a story about this?

Take three sticks. Take one more stick. How many sticks have you?

Who will tell me a story about this?

Each take an envelope. Take out four objects, and think of a story for three things and one more thing. Who is ready with a story?

If you nod your head three times, and then once, how many times do you nod your head?

If you have three cents and one cent, how many have you in all?

You may tell me about three bugs and one bug; three bicycles and one bicycle.

If there are three cows in a pasture, and I turn in another cow, how many cows in the pasture then?

If there are three street cars in a row, and another street car comes up to them, how many street cars are there then?

If you jump three feet, and then jump one more foot, how many feet will you jump in all?

If you bring in three armfuls of wood before breakfast, and one after, how many armfuls of wood will you bring in altogether?

If you have three dresses for your doll, and make one more dress, how many dresses will she then have?

You may tell me about three boys and one boy; three books and one book; three words and one word; three clocks and one clock; three lamps and one lamp.

Exercise for Review.

If there is nothing on your desk, and I lay one block there, how many things will there be on your desk?

If you have no playthings, and I give you a ball and a top, how many playthings will you have?

A cat is playing with a mouse; how many animals are there? The kitten comes to join the fun; how many are there now? The mouse gets away and slips into a hole; how many are left? The kitten runs off to play; how many are left?

A dog and a pup come into the room together; how many animals?

Here is a couple of blocks; how many blocks?

Show me a couple of spools; a couple of buttons; a couple of pictures.

How many boots does it take to make a pair of boots?
how many mittens to make a pair of mittens?

If you have a pair of boots and an odd boot, how many have you?

If you sell the odd boot, how many boots will you have?

If you wear out one of these boots, how many boots will you have left?

If you find another odd boot, how many boots will you have?

In a stable is a pair of horses and a single horse. How many horses are in the stable?

If the owner drives out with the pair, and his daughter with the single horse, how many horses will be left in the stable?

If there are four mittens on the radiator, to how many little boys do you think they belong?

If four stockings are hung up Christmas Eve, how many children will be up bright and early Christmas morning to see what is in the stockings?

If Santa Claus brings to each of these children a bag of candy, how many bags will he bring?

One block and one block are how many blocks?

One block and two blocks are how many blocks?

Three blocks and one block are how many blocks?

Two blocks and one block are how many blocks?

Two blocks minus two blocks are how many blocks?

Three blocks minus two blocks are how many blocks?

How many pairs of mittens does it take for one boy?
how many mittens?

How many pairs of boots does it take for one boy? how many boots?

How many pairs of boots does it take for Harry and Ned?
how many pairs of stockings? how many pairs of skates?

You may write the word **one** on your slates.

One and Three.

Take one block. Take three more blocks. How many blocks are one block and three more blocks?

Tell me a story about one shovel and three more shovels, Jamie; about one fan and three more fans, Annie; about one pail and three pails, Harry; about one bell and three bells, Alice; about one drum and three drums, Joseph.

(The objects referred to are of paper, and when not in use can be neatly packed away in separate envelopes.)

One chicken and three chickens are how many chickens?

One kitten and three kittens are how many kittens?

One boy and three girls are how many children?

Tell me a story about one dove and three doves.

Who has a story for one and three are four? another? another? another?

Four minus One.

Put one of your four blocks under the table.

How many have you left?

Tell me a story about four blocks minus one block; four books minus one book; four apples minus one apple; four button-hooks minus one button-hook; four knives minus one knife; four boxes minus one box.

If one wheel should come off a carriage, how many wheels would be left?

If a dog hurts one of his legs, on how many legs does he walk?

Exercise for Review.

How many fingers do I hold up? (Four.) Now? (Three.) Now? (Two.)

How many blocks do I show you? (Four.) How many marks on the board? (Two.) How many pieces of paper? (Three.)

(Teacher shows two blocks and one block.)

How many here? (Touching two.)

How many here? (Touching one.)

Tell me what you see, then.

(I see two blocks and one block.)

Who sees two blocks and one block?

How many blocks are two blocks and one block?

Read, then, what I show you.

(Teacher shows a group of two and a single block; then slowly brings the two groups together, while the child reads, Two blocks and one block are three blocks.)

Read the same with these spools.

(Two spools and one spool are three spools.)

With these buttons; with these cups.

Read what I show you now.

(Three splints and one splint are four splints.)

Now.

(Three boxes and one box are four boxes.)

Now.

(One shell and one shell are two shells.)

These exercises are very important in training the eye to quick and accurate seeing.

Four minus Three.

Take four blocks.

Put three of your four blocks under the table; how many remain?

If I have four plums, and eat three plums, how many plums have I left?

If George has four tops, and three will not spin, how many will spin?

If there are four pencils on the table, and three fall off, how many remain on the table?

Four boys are on one sled; three get tipped off; how many remain on the sled?

Four cards are on a shelf; three fall off; how many remain on the shelf?

Make four marks on the board; rub out three; how many are left?

Four postage stamps are in the drawer; I use three; how many are left?

If you have four cents, and buy a three-cent postage stamp, how many cents have you left?

Tell me a story about four minus three.

Exercise for Review.

Tell me a story about four minus one; three minus one; two minus one; one minus one; three minus two; two minus two; three minus three.

Johnnie has three words written on his slate, and Bennie two; which has more? how many more?

Bennie and Ned had each a pair of mittens; Bennie lost one of his mittens and his mother knit another pair for him; which had the more mittens then? how many more?

A dog, a boy, his sled, and a girl on the sled, are how many?

A boy left his coat on the chair, his hat on the table, and his book on the floor; how many things did he have to pick up and put in place?

There is a clock, a vase, a picture, and a large shell on my shelf; I remove the clock, the vase, and the picture; how many things remain on my shelf? I put back the clock and the vase; how many things are then on my shelf?

Two and Two.

Take two blocks. Take two more blocks. How many are two blocks and two blocks?

You may choose the objects that you wish to talk about, and tell me a story about two things and two more things.

Your two hands and my two hands are how many hands?

Your mittens and my mittens are how many mittens?

You may call your blocks tin pails, and tell me a story about two tin pails and two tin pails; tell me about two cows and two cows; two cups and two cups; two forks and two forks; two chairs and two chairs; two pins and two pins; two pictures and two pictures; two bells and two bells; two fans and two fans.

Take a couple of buttons; take two more buttons. How many buttons have you?

One boy had two tops; another had two balls. How many playthings had they together?

If they exchanged a ball and a top, how many playthings would each have?

How many would they have together?

Here is a cup and saucer, and here is a cup and saucer; how many cups? how many saucers? how many cups and saucers together?

Four minus Two.

Hold up four fingers; shut down two; how many remain up?

Show me four buttons; cover up two; how many remain in sight?

Here are four dogs; you may have two; how many have I?

Here are four spoons; we will put two away; how many remain?

Show me four blocks; take two away; how many have you? Tell me a story about this; another; another.

If there were four buttons to sew on your boot, and mamma sews on two, how many more will there be to sew on?

If you have four cents, and buy a two-cent postage stamp, how many cents have you left?

If you have four errands to do, and do two of them, how many have you left to do?

Exercise for Review.

Show me three splints; how many times can you take one away before they are all gone?

Show me two splints; how many times can you take one away before they are all gone?

Four boys start off for some fun, and two get angry; how many have the fun?

Four little girls have a party; two play with dolls, and the rest play company. How many play company?

Tell me two things they talk of.

Tell me three games you can play.

Dates, figs, raisins, and prunes; how many kinds of fruit?

Three sparrows are taking a bath in a fountain, and one sparrow is on the edge of the fountain; how many more sparrows are taking a bath than are on the edge of the fountain?

A cat, two kittens, and a mouse are how many animals? The mouse runs away; how many animals are left? The cat runs after the mouse; how many are left? One kitten runs off; how many then remain?

What is left when three cents are taken from four cents? two spools from four spools? one button from four buttons? three oranges from three oranges? three pies from four pies?

Four divided by Two.

In four cents how many two cents?

There are four doves, two in a nest; how many nests?

There are four stockings; how many pairs?

I have four mittens; how many pairs?

If you have four boots, how many pairs have you?

There are four door-knobs, two on a door; how many doors?

If there are four kittens, two on a mat, how many mats?

I see four blinds, two on each window; how many windows?

I have four apples, two on a plate; how many plates?

There are four children, two at a desk; how many desks?

I have four cents; how many apples can be bought at two cents apiece?

There are four trunk-handles; how many trunks?

I have four sticks of candy, and give them to two children, giving the same number to each; how many sticks does each child receive?

There are four pillows, two on a bed; how many beds?

Take two blocks from your four blocks just as many times as you can; how many twos do you find in four?

Exercise for Review.

A bookseller had four rows of books in his window; one row tumbled off; how many rows remained?

He then took down two more rows; how many were left?

Afterward he put back the three rows; how many rows were there then?

Charley gets a cent for every paper he sells; how many cents will he get for selling three papers?

Harry has four cents ; he spends one cent, and then he earns another ; how many cents has he ?

Tom has two cents and spends one, then earns one ; how many cents has he ?

Mary has four cents and spends two cents, and then earns two more ; how many cents has she ?

If Ed had one cent and should earn three more cents, and then spend three cents, how many cents would he have ?

If I had some pencils on my desk and should give you three, then get three from the library, how many more pencils would I have on my desk than before ? If I gave you four, and then got three from the library, how many less would I have on my desk ?

If you have some money and spend four cents, then I give you two cents, have you more or less money than at first ? If you spent two cents, and I should give you four, would you have more or less money than at first ?

Two Twos.

Show me two blocks ; another two blocks.

How many blocks in all ?

Here are two buttons ; take two more buttons ; how many have you ?

Show me two paper patterns ; two more ; how many paper patterns in all ?

There are two sleeves to one dress ; how many sleeves to two dresses ?

There are two mittens in one pair ; how many in two pairs ?

There are two horses in one span ; how many horses in two spans ?

There are two covers to one book ; how many covers to two books ?

If there are two bottles to one inkstand, how many bottles to two such inkstands?

There are two blades to one knife; how many to two such knives?

How many hands have two boys? how many eyes? how many cheeks? how many ears? how many thumbs?

How many boots will it take for two boys?

How many pairs of boots will it take for two boys?

Two apples cost two cents each; how many cents do both cost?

If I buy two pencils at two cents each, how many cents do I pay?

Two pens cost two cents each; how many cents do both cost?

Two books cost two cents each; what do both cost?

Exercise for Review.

You may take three blocks; arrange them all the ways you can. You may arrange three straight lines on the board all the ways you can; three dots on the board.

Point in three directions.

You may touch each one of three blocks and say "one" each time. How many times did you say "one"?

Do the same with two. How many times did you say "one"?

Do the same with four. How many times did you say "one"?

Four minus Four.

Here are four blocks on the table; put four under the table. How many are left?

There were four lamp chimneys; four got broken. How many whole ones are left?

There were four apples in the drawer; four were taken out of the drawer. How many were left in the drawer?

There were four poor i's on a slate; the teacher rubbed out four poor i's. How many were left to be seen?

There are four books to cover; I cover four. How many remain to be covered?

Four men were in the post-office; four men left the post-office. How many men were in the post-office then?

Four boys were turning summersaults; the recess-bell rang, and four boys went into school. How many boys were left turning summersaults?

Four girls were making wreaths; four girls went in to dinner. How many were left making wreaths?

Four divided by One.

Here are four cents; see how many pictures at a cent apiece you can buy of George.

See how many tops at a cent apiece you can buy; how many pencils at a cent apiece; how many erasers at a cent apiece; how many sheets of paper at a cent a sheet.

I have four apples. To how many children can I give them if I give one to each child?

I have four sponges to lend. How many boys can I supply with sponges, giving one to each?

Grace has four more stories to write in her language book. If she writes one a day, how many days will it take to finish her book?

How many boys will four hats supply?

Four Ones.

Here are four cups, each with a handle. How many handles in all?

Here are four knives. How many handles?

Here are four saucers, each with a cup. How many cups are here?

There are four boys, each with a hat. How many hats do you see?

There are four girls, each with a fan. How many fans have they?

I see four slates, each with a pencil. How many pencils can I see?

There are four books, with a book-mark in each. How many book-marks in all?

There are four tables, each with a cover. How many covers does it take?

§ 8. COMPARISON OF FOUR WITH NUMBERS KNOWN.

I have four cents, Jamie has three. Who has more? How many more?

I have four pencils, Willie has three. How many more have I?

One hen has four chickens and another has three; how many more has the one than the other?

One man walks four miles an hour, another three; how many more miles does the first walk?

Tell me a story about this; another; another.

How many more legs has a dog than you?

A chair has four legs and two rockers; how many more legs than rockers has the chair?

A chair has one seat and four legs; how many more legs than seats?

My pencil cost two cents, my rubber four; how many more cents did my rubber cost?

Four books are how many more than three books? than one book? than two books?

How many dots have I shown you on the board? Put enough dots with it to make four. How many did you add to make four?

How many dots do I show you this time? Add enough to make four. How many did you add?

Add enough dots to this number to make four dots. How many did you add?

Erase enough of these four dots to leave one dot. Of these four dots to leave two. Of these four dots to leave three dots.

A two-cent coin is equal in value to how many one-cent coins? Then two two-cent coins are how many cents more than a one-cent coin? how many cents more than three one-cent coins?

One doll is how many less than four dolls? Two dolls are how many less than four dolls? Three dolls are how many less than four dolls?

A dog has four legs and one tail; how many more legs has he than tails?

A horse requires four shoes, and a boy two; how many less does the boy require than the horse?

A lamb has four legs, two eyes, and two ears; how many more legs than ears? how many more legs than eyes? how many more legs than eyes and ears together?

Four are how many more than three? than two? than one? than none?

Three are how many less than four? two are how many less than four? one is how many less than four?

Copy :

•
one.

• •
two.

• • •
three.

• • • •
four.

CHAPTER IV.

THE NUMBER FIVE.

§ 9. FIVE AS A WHOLE.

Show me four blocks; put one more with them. You have shown me five blocks.

Show me five fingers; five children; five marks on the board.

Make five *u*'s; five *i*'s.

Show me five words on the board that you know.

Show me five sticks; five pencils; five pieces of paper; five desks; five chairs.

Bring me five things from the play table; five things from my desk.

Tell me where you have seen five men; five horses; five cars; five birds.

What else have you seen five of?

Copy the word *five*.

§ 10. DISCOVERIES IN FIVE.

Show me five blocks.

Put your blocks as I put mine.

Who can put his some other way? some other way? some other way?

I will take one of my five blocks away. You may do the same.

What other number can you take away? what other? what other?

Exercise for Review.

Tell me how many blocks are four blocks minus one block. (Teacher performs the operation with the blocks as child reads.)

Three blocks minus one block.

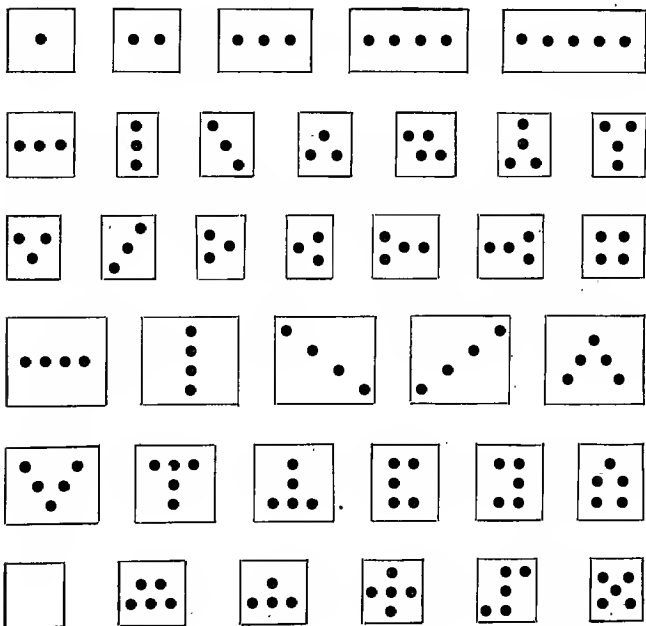
Two blocks minus one block.

One block minus one block.

Read this. (Teacher shows a number of blocks and takes away some of them. Child reads as above.)

Read this. (Four minus two are two.)

Tell me the number of dots as I point.



§ 11. FACTS IN FIVE.

Four and One.

Take four blocks. Take one more block. How many blocks are four blocks and one block?

Make four marks on the board. Make one more mark on the board. How many marks are four marks and one mark?

Find four bright stars on my chart. Find one more star. How many stars have you found?

Find four rings and one ring. How many rings?

Show me four blocks; one more block. How many have you in all?

Show me four buttons and one button. How many buttons?

I show you four fingers on one hand, and one finger on the other. How many fingers?

I have four bits of crayon in one hand, and one in the other. How many bits of crayon in all?

If I have four blocks, and you give me one more, how many blocks shall I have?

Give me four splints, please; now give me one more. How many have I?

How many horses are four horses and one horse?

How many cows are four cows and one cow?

How many days are four days and one day?

How many weeks are four weeks and one week?

How many months are four months and one month?

How many years are four years and one year?

How many boys are four boys and one boy?

I see four stars in the sky; one more shines out. How many stars can I see?

Four white clouds and one white cloud are how many clouds?

Four dogs are playing in the street, and another dog is looking on. How many dogs in all?

One and Four.

Show me one block; now show me four more. How many have you shown me?

One block and four more blocks are how many blocks?

Show me one button; show me four more buttons. How many buttons?

Tell me a story about one and four; another; another.

If there is one pig in the pen, and four more are put in the pen, how many will there be in the pen?

One boy is playing foot-ball, and four more come to play with him. How many boys are then playing foot-ball?

One fly is in the room; four more get in. How many flies are in the room?

One fly is in a spider's web; four more get caught. How many flies are in the web?

One hat was on the rack; four more are hung with it. How many hats are on the rack?

One little boy is looking out of the window; four more come to look out. How many are looking out of the window?

Annie finds one pin one day, and four pins the next. How many pins does she find altogether?

Five minus One.

Show me five blocks.

Put one of your five blocks under the table.

How many have you left?

Tell me that story.

You may call your blocks rabbits, and tell me that story.

Call yours dolls, and tell me a story like this. Who will tell me another? another? another?

School keeps Monday, Tuesday, Wednesday, Thursday, and Friday; five days in the week. If you are absent one day, how many days do you come?

There are five fingers on one hand, with the thumb. How many without the thumb?

You had five *i*'s on your slate; I rubbed one out. How many remained?

Five boys play ball; one does not like it, and goes off. How many boys are left?

Five persons are at a table; one is excused. How many remain?

Five boys are playing fox and geese; one boy is the fox, and the rest are geese. How many are geese?

I have five nuts, but one is bad. How many are good?

There are five teams in the street, and one moves off. How many are left?

Five boys are skating, and one falls down. How many go on?

There are five biscuits on a plate. If you eat one, how many remain?

Five minus Four.

Show me five blocks.

Put away four.

How many have you left?

Tell me how many are five spools minus four spools.

There were five eggs in the basket; I have used four. How many are left?

There were five Noah's Arks in the shop window, and a man bought four. How many were left?

There were five leaves on a twig; four blew off. How many were left on the twig?

Five little girls are reading; four find a word they do not know. How many read on?

I have five mittens; four are alike. How many are odd?

There were five geranium blossoms, but four faded. How many were left?

If I have five postal cards, and send away four, how many have I left?

If George cuts an apple into five pieces, and gives away four, how many has he left?

Sarah had five pieces of cake, and gave four pieces to some little beggar children. How many pieces had she left?

There are five things in a little tray on the table: a pencil, a rubber, a knife, a pen-holder, and a paper-cutter. If I take out the knife, the pencil, the rubber, and the pen-holder, how many remain?

Exercise for Review.

Make five straight up-and-down lines on the board. Five right-and-left lines. Five slanting lines.

You may name the days of the week that you come to school. How many days?

Who can point to five things in the room? to five figures on the clock?

How many hands on the clock?

The long hand goes round the face each hour. How many times will it go round in two hours? in three hours? in four hours?

Ned goes to school four hours in the day, and Jamie one more hour. How many hours does Jamie go to school?

If one spool of cotton costs two cents, how many cents will two spools of cotton cost?

I can pick two quarts of berries in an hour; how many quarts can I pick in two hours?

If it takes me an hour to pick two quarts of berries, how many hours will it take to pick four quarts of berries?

There are four lamp-posts on the street, and one more is put up. How many lamp-posts are there? Show me this on the board, by drawing the lamp-posts.

I could see four boats on the water, and one more came in sight. Show me on the board how many were in sight then.

Four trees were in front of our house, but one had to be cut down. Show me on the board how many were left.

I know where there are two bird's nests, with two blue eggs in each nest. Show me how many eggs there are in both nests.

At the table this noon there were five plates, with an apple on each plate. Show me this on the board, and tell me how many apples there were.

Read what I show you.

Mary, show Nettie something to read; show Jennie something to read; show Cyrus something to read.

Annie, show Mary something to read; show Cyrus something to read.

If I draw one tree upright, on the board, and four lying down, how many trees do I draw altogether?

If I teach four classes in the morning, and one in the afternoon, how many classes do I teach?

There were three funny bonnets, and another funny bonnet came to join them. How many funny bonnets then?

One funny bonnet went off pouting. How many funny bonnets were left?

A little girl was under each funny bonnet. How many little girls were there?

If I cut one apple into two pieces, and then another into two pieces, how many pieces have I?

If I give two pieces away, how many pieces have I left?

I have here two pieces of paper; I will cut each into two equal pieces. How many equal pieces have I?

Show me a couple of pieces. Play these pieces are ducks. Show me a pair of ducks. Play they are dollar gold pieces. Show me two dollar gold pieces.

Show me one dollar gold piece, and three dollar gold pieces. How many dollar gold pieces?

Here is another dollar gold piece. Put it with those you have. How many dollar gold pieces have you now?

I have a stick which I will divide into four equal pieces. Show me two of the equal pieces. How many more equal pieces are there?

Call these four splints silver spoons. Put three in the spoon-holder, and tell me how many you have left.

Take one of the spoons from the spoon-holder, and tell me how many will remain in the spoon-holder.

Three and Two.

Show me three spools; put two more with them. How many spools in all?

Give me three buttons; now give me two more. How many have I?

Shut your hand; open three fingers; now open two more. How many fingers are open?

Here are three knives and two forks. How many things are here?

Three cups and two saucers stand on the table. How many things on the table?

If Nettie comes to school three days and two days in the week, how many days does she come to school?

If there are three slices of bread on one plate, and two on another, how many on both plates?

There are three little kittens in the basket, and two on the floor. How many kittens in all?

Three cents and two cents are how many cents?

A three-cent stamp and a two-cent stamp cost how much? a three-cent pen and a two-cent pen? a three-cent ticket and a two-cent ticket? a three-cent paper and a two-cent paper?

It costs me three dollars to go to Nashua, and two dollars from Nashua home. How many dollars is my fare home?

Ned learns three words in the morning, and two in the afternoon. How many words does he learn?

Who can tell me a story about three soap-bubbles and two soap-bubbles? three honey-bees and two honey-bees? three boats sailing down the river and two boats sailing up the river?

Two and Three.

This knife has two blades, and this has three; how many blades have both knives together?

Here are two pebbles in this hand, and three in this; how many in both hands together?

I make two dots; now I make three more. How many dots have I made?

If you make two *u*'s on the board, and then make three more, how many *u*'s will you make?

Show me that two sticks and three sticks are five sticks; that two pencils and three pencils are five pencils; that two fingers and three fingers are five fingers; that two boys and three girls are five children.

Five minus Two.

Show me five blocks; take away two blocks. How many blocks remain?

Tell me that story.

Show me five splints; put back two of the splints. How many splints have you now?

Call your splints men, and tell me that there were five men, and that two walked away.

Call them lamp-posts, and tell me that two had no lamps on them.

Call them chimneys which a man had to build, and tell me that he has built two.

Call them slate pencils, two of which got broken.

Call them curtain sticks, two of which were used for curtains.

Johnny made five 2's on his slate; two had straight lines, the rest did not. How many did not?

George had five apples, and gave two of them to his little brother. How many apples had he left?

There are five school days in a week. If it is so stormy that Annie is absent two days, how many days does she come?

..... A geranium blossom has five petals. If two petals fall off, how many remain on the blossom?

A pansy blossom has five petals. If two are black and the rest bright, how many petals are bright?

A lady had a calla lily with five blossoms on it. She cut off two of the blossoms. How many remained on the lily?

A man had five horses; two were always used in a span. How many beside the span did he have?

There were five peas in a pod. When the pod was opened, one flew up in the air and one fell on the floor; the rest went into the pan. How many went into the pan?

Five little girls were running in a line. One got snapped off, and another fell down. How many were left in the line?

Five boys were playing fox and geese. One boy was the fox, and one goose got caught before he could hide. How many geese remained to be caught?

Who has a story to tell me for five minus two?

Five minus Three. •

How many dots do I show you on the board? (Five.)
You may rub out three dots. How many dots are left?
Five dots minus three dots are how many dots?

Here are five lines; you may cross out three lines. How many lines are not crossed?

There are five erasers at that board; you may bring three of them to this board. How many remain at that board?

Five children may stand in a row; three may walk off. How many are left in the row?

Show me five fingers on one hand; shut down three. How many remain open?

Here is a step-ladder with five steps. When I have mounted three steps, how many more steps will there be to mount?

Here are five pencils; distribute three of them to the children. How many have you left?

Each take five blocks; put three of them behind you. How many remain on the table?

Tell me a story for that.

Tell me a story for five feet of snow, three feet of which melted away.

You are in school five hours a day. If three are in the morning, how many are in the afternoon?

If you have five lines of *n*'s to make, and have made three, how many more lines of *n*'s must you make?

If you have five words to write, and write three, how many more words have you to write?

If you have five cents, and buy a book for one cent, two pencils for a cent, and ten sheets of paper for a cent, how many cents have you left?

If I buy a three-cent postage stamp, and give five cents in payment, how much change ought I to receive?

I have a pail which holds five pints of milk; there are three pints of milk in it. How much more will it hold?

Here are five marks on the board, which you may call boys. One boy turned down Depot Street, another went up Pleasant Street, and one went into the post office; the rest walked along together. How many walked along together?

Exercise for Review.

How many sides has this triangle?

How many corners has this triangle?

How many sides has this square?

How many sides has this blackboard?

How many corners has this blackboard?

Make a square with blocks, putting one block on a side. How many blocks does it take?

Put a bean in each corner of this square. How many beans does it take?

Make a triangle, putting a block on each side. How many blocks does it take?

Put a button in each corner of the triangle. How many buttons does it take?

How many corners has this table?

How many sides has this table?

How many legs has a piano?

How many stands has a piano-stool?

If there are four piano-stools, how many stands are there?

There are two ends to your desk, and a front side, a back side, and a top. How many parts to your desk?

Who will show me five things?

Who will show me four things?

Who will show me three things?



Read what I show you. (Teacher shows child any operation in Addition or Subtraction that he has seen. Pupil reads as teacher makes the changes.)

Show me that three spools and two spools are five spools; that two spools and three spools are five spools; that four spools and one spool are five spools; that one spool and four spools are five spools.

One minus one is how many?

Two minus one are how many?

Three minus one are how many?

Four minus one are how many?

Five minus one are how many?

Two minus two are how many?

Three minus two are how many?

Four minus two are how many?

Five minus two are how many?

Five minus Five.

How many blocks have I? (Five.)

Tell me how many I have taken away. (Teacher puts five under the table.)

How many have I left?

You may show me that, and tell me about it.

Some one else show me that five minus five leaves none.

You may each call your blocks fruit, and tell me about five minus five. Call them animals. Call them dishes. Call them chairs.

Here are five kittens; five are asleep. How many are awake?

There were five horse-cars in the street; five were moving. How many were still?


If I have five pencils in my box, and take out five, how many are left?

Exercise for Review.

Arrange your blocks on the table just as I arrange these dots on the board.




One dot at each corner and one dot in the middle make how many dots?

Like this.  How many have you?

Like this.  Like this. 

One dot in the upper row and three dots in the lower row make how many dots?

Three dots in the upper row and two dots in the lower row make how many dots?

Like this.  How many did I make this time?

If you have two weeks' vacation in the fall, and three in the winter, how many weeks' vacation does that make? If you visit three weeks, how many weeks do you stay at home?

A knife, a string, a bit of crayon, a cent, and a nail were found in Ned's pocket. How many things? He gave the crayon to me, spent his cent, drove his nail into a board, and lost his knife. How many things remained?

Five divided by One.

Here are five dolls; give one to each little girl. To how many little girls can you give them?

Here are five cents; put each in a box by itself. How many boxes does it take?

Here are five crayons; put each at a board by itself. How many boards does it take?

Here are five paper rings; put each on a finger by itself. How many fingers does it take for the five rings?

Here are five cards; put each in an envelope by itself. How many envelopes will it take?

If a housekeeper had five eggs, and used one a day, how many days would the five eggs last her?

If a family used a pound of butter a day on the table, in how many days would they use five pounds?

Jamie has five cents; he earned a cent a day. How many days did it take him to earn the five cents?

Five Ones.

Show me five blocks, with a button on each block. How many buttons are there?

Show me five boxes, with a shell in each box. How many shells do you show me?

Here are five boys; each may take one block. How many blocks have the boys together?

Show me five tin plates, with a paper cent in each plate. How many cents have you shown me?

Show me a cup in each plate. How many cups?

Five boys have each a slate. How many slates do they all have together?

If each of the five slates has a sponge fastened to it, how many sponges have all the slates?

If each of the five slates has a pencil on it, how many pencils have all the slates?

If each pencil cost a cent, how many cents did the five pencils cost?

If five books cost each a cent, how many cents do the books cost?

Five boys bought each a sled. How many sleds did all buy together?

I have five little nephews, to whom I give a Christmas present apiece. How many presents must I buy?

If each hangs up his stocking Christmas Eve, how many stockings will be hung up?

Exercise for Review.

Put on the board marks for what I show you. (Teacher shows different combinations of numbers. Child shows the same combination with marks on the board. Teacher shows a number and subtracts from it. Child shows the number on the board and crosses out the number subtracted.)

Read what you have shown me on the board.

Illustrate, with marks on the board, the stories I tell you:

Three men were raking hay; two more men went to rake hay with them.

Three hens roosted in a tree, and two on a fence.

I have three plants, with a blossom on each plant.

I have three baskets, with two handles on one, and one handle on each of the others.

I have three cents in one hand, and one cent in the other hand.

James put five eggs in his pocket, and two broke.

There were five Christmas trees in a ring, and a beautiful light on the top of each tree.

I can see five houses, with a chimney on each house.

I have at home a cat, two kittens, a dog, and a bird.

Three boats are going up river, with a man in each boat.

Four frogs are croaking in a pond.

Ed has two rabbits, two squirrels, and a parrot.

Take this paper money. Johnny may be the salesman. The others may be his customers and buy these things that are on the table.

Nettie may be the first customer.

"How do you sell your apples?"

"I sell them at two cents apiece."

"I will take two." (Nettie passes a five-cent piece in payment.)

"Two apples at two cents apiece, four cents, and one cent are five cents."

Maggie may be the second customer.

"I wish for a spool of white thread."

"What number do you wish?"

"Number 60."

"It is four cents."

(Maggie passes a five-cent piece in payment.)

"One spool of thread, four cents, and one cent are five cents."

Mary may buy this time.

"I wish for five of these pictures."

"These pictures are a cent each."

(Mary counts out her five cents and passes it to the shop-keeper.)

Mabel may buy.

"I will take three one-cent pencils." (She gives two two-cent pieces in payment.)

"Three pencils at a cent apiece, three cents, and one cent are four cents."

§ 12. COMPARISON OF FIVE WITH NUMBERS KNOWN.

Show me one block.

○

Show me two blocks beneath this.

○ ○

Show me three blocks beneath these.

○ ○ ○

Show me four blocks beneath these.

○ ○ ○ ○

Show me five blocks beneath these.

○ ○ ○ ○ ○

Which is the smallest number?

Which is the largest number?

Which is one more than one?

Which is one less than five?

Which is one more than two?

Which is one less than four?

Which is one more than three?

Which is one less than three?

Which is one more than four?

Which is one less than two?

Five is how many more than four?

Five is how many more than three?

Five is how many more than two?

Five is how many more than one?

Five is how many more than none?

Four and how many are five?

Three and how many are five?

Two and how many are five?

One and how many are five?

Five minus one are how many?

Five minus two are how many?

Five minus three are how many?

Five minus four are how many?

Five minus five are how many?

Jamie has five buttons on his jacket, and Harry has four.

Which has more? How many more?

I have two two-cent pieces, and a five-cent piece. Which is worth the more? How much more?

Nellie has copied her words twice, and she has to copy them five times. How many more times must she copy them?

I have five letters to answer. If I answer three, how many more have I to answer?

Jennie has five handkerchiefs to hem. If she hems four, how many more has she to hem?

Harry has a five-cent piece; Tom has a one-cent piece and a two-cent piece. How much more money has Harry than Tom?

Copy:

•
one.

• •
two.

• • •
three.

• • • • •
four.

• • • • •
five.

§ 13. ONE-HALF.

What have I? (An apple.)

I will give you part of my apple. I will give Mamie the other part.

Look at the two pieces into which I cut the apple. Which is the larger piece? (The answer, "They are just the same," is usually given. Give the word "equal" for "just the same.")

What have I now? (A card.)

I will give Ned a part of this card. I will give Annie the other part.

Look at the two pieces into which I have cut the card. Which is the larger piece? (They are equal.)

You may cut this apple into two equal pieces.

You may cut this paper ring into two equal pieces.

You may cut these paper scissors into two equal pieces.

You may divide this envelope into two equal pieces.

You may divide this square into two equal pieces.

Show me the two pieces into which you cut the apple. What part of the apple is each piece?

Each of the pieces is one-half of the apple.

Show me one-half of the apple.

Show me the other half of the apple.

Show me the two pieces into which you cut the paper ring. Which is the larger piece?

Show me one-half of the ring.

Show me the other half of the ring.

Into how many pieces did you cut the paper scissors? Are the pieces equal?

Show me one of the two equal pieces. Can you tell me what part of the scissors it is? Show me the other half of the scissors.

Show me one-half of the envelope.

Show me one-half of the square.

Ned, you may give Susie half of this apple, and keep the other half yourself.

Look at the two halves of the apple. Which is the larger?

I will divide this apple into halves. Into how many parts do I divide it?

What part of the apple is this? (Holding up one half.)

What part of the apple is this? (Holding up the other half.)

Show me half of an apple.

Show me another half of an apple.

Show me half of this sheet of paper; half of this ring; half of this circle; half of this string.

Draw a line so as to divide your slate into two equal parts. What part of your slate is one part? is the other part? is each part?

Here is a square on the board. Draw a line so as to divide it into two equal parts. What part of the square is each part?

Show me what you think to be half of this stick; half of this block; half of this pencil; half of this table; half of this line; half of the window; half of this blind; half of this radiator.

Here are two blocks. Put them into two groups, and have just as many in one group as in the other. How many in each group? (One.)

One block is one-half of two blocks.

Show me one-half of two blocks.

-- One-half of these two sticks is how many sticks?

One-half of these two buttons is how many buttons?

One-half of these two pencils is how many pencils?

Cyrus had two cents. He gave half of what he had to me. How many cents did he give me?

Here are four blocks. Put them into two equal groups.
How many in each group?

Two is one-half of four.

Show me one-half of four blocks. How many blocks in one-half of four blocks?

Show me one-half of four buttons. How many buttons?

Show me one-half of four sticks. How many sticks?

If I have four apples, and give you half of what I have, how many shall I give you?

If I give you half of my four cards, how many cards shall I give you?

If I have four weeks' vacation, and spend half of it here, how many weeks shall I stay here?

If I spend the other half of it at home, how many weeks shall I spend at home?

Take two blocks, and separate them into two equal parts. How many in each part?

Take four blocks, and separate them into two equal parts. How many in each part? What part of four blocks are two blocks?

This is one-half an apple. How many such parts make a whole apple?

Here is half a sheet of paper. How many such pieces of paper make a whole sheet of paper?

Here is a half-pound weight. How many such weights make a pound?

Baby drinks a half-pint of milk every morning. How many mornings will it take to drink a pint?

A pint is half of a quart. How many pints does it take to make a quart?

How many halves of an apple make a whole apple?

How many halves of an orange make a whole orange?

How many halves of an hour make a whole hour?

How many halves of a pencil make a whole pencil?

CHAPTER V.

THE NUMBER SIX.

§ 14. SIX AS A WHOLE.

Show me five blocks. Show me one more block. You have shown me six blocks.

Show me six fingers; six children; six marks on the board; six desks; six rounds on the settee.

Find a card with six dots on it.

Find six cents; six buttons; six bits of crayon.

Make a pen and put six pigs in it.

Here is a hen on the board. She has six chickens. Make dots on the board for the chickens.

Here is a block of houses. It has six chimneys. Make a straight line for each chimney.

Where have you seen six things?

Name six things you have seen at home, and take a block for each thing.

Name six things you have seen in the shop window; on the street.

Name six days in the week; six months in the year.

Who is six years old?

Two boys may stand here, back to back. Each walk straight ahead over three boards. How many boards apart are you?

Stand in the same way again. Each boy pass three desks and stop. How many desks are between you?

Copy the word **six**.

§ 15. DISCOVERIES IN SIX.

Look at your six blocks.

Who can find out something about six?

What has Jennie found? (Two threes in six.)

Bennie? (Three twos in six.)

Ned? (Five and one are six.)

Harry? (Three taken from six leave three.)

Mary? (Six taken from six leave none.)

Four and how many are six?

Two and how many are six?

One and how many are six?

Let me see what you can take away when you have six things.

Call them geese, and let a fox catch some of them.

Johnny, how many has he caught of yours? How many have you left?

How many has he caught of yours, Mary, and how many have you left? Ned? Bennie? Jennie?

Who can tell me a story about six? another?

Exercise for Review.

If a boy stands at each door in this room, how many boys will you see standing at doors?

If I tell John to lower half the windows in this room, how many windows will he lower?

If I have three pencils and break one, then buy two and give one away, then lose one, how many shall I have?

If I take three steps forward, and then come back two steps, then go on three steps, how many steps away am I from where I started?

If you get three Christmas cards in the mail, and two in your stocking, how many cards will you receive in all?

If I buy a dozen Christmas cards at one store, and two dozen at another store, how many dozen do I buy in all?

If it takes a two-cent stamp to send one Christmas card, how many stamps will it require to send two such cards? How many cents will it cost to buy the two stamps?

If you have two holidays in the fall term, and two in the spring term, how many holidays will you have in both terms?

Show me a half of six; a half of four; a half of two; a half of this square; a half of this rectangle; a half of this piece of twine; a half of your forefinger; a half of your arm; a half of your face; a half of this table.

If you separate these four blocks into two *equal* groups, how many blocks will there be in each group?

What part of four blocks are these two blocks?

What part of four pencils are these two pencils?

What part of four cups are these two cups?

If you must put away your boots, hang up your cap, and brush your hair before supper, how many things have you to do?

A milkman had to go a mile and a half to the pasture to milk his cows, and back again, in the morning. How many miles did he have to go in all?

A man has a garden to dig, which will take him four days; but he hires a man to help him. How many days will it take both together to dig the garden?

How many rows of teeth have you? How many fingers on one hand?

Tell me a story about four minus three; five minus three; three minus three; three and two; two and two; five minus four.

Who can tell how many blocks I show you? how many now? how many now? how many now? Show me four blocks; five blocks; three blocks.

§ 16. FACTS IN SIX.

Five and One.

Take five blocks. Take one more block. How many blocks are five blocks and one more block?

Ella may take five pink shells. She may put one more shell with them. Who knows how many shells Ella has?

Peter may take five pictures. He may take one more picture. Who knows how many pictures Peter has?

Annie may pick out five red stars and one blue star. How many stars has Annie?

Find five things of one color and one of another color, and tell me how many you have.

If I find five raisins in one piece of cake, and one in another, how many do I find in all?

If I give you a five-cent piece, and a one-cent piece, how many cents do I give you?

If you write a word on your slate five times, and then write it once more, how many times do you write it?

Tell me a story about five articles and one article; another; another.

One and Five.

Alice may show me one pail. John may show me five more pails. How many pails do both show me?

Jamie may give one blue stick to Jennie, and five red sticks to Nellie. Who will tell me how many sticks both have?

Make one mark on the board with this yellow crayon, and five marks with this blue crayon. How many marks have you made?

Make one large dot on the board with this green crayon, and five dots with the red crayon. How many dots have you made?

Show me one spool; put five with it; how many now?

Show me one top; put five with it; how many now?

Show me one paper shovel; put five paper shovels with it; how many paper shovels are there now?

Show me one paper hat; put five paper hats with it; how many paper hats are there now?

If there is one girl standing to read, and five more stand with her, how many are standing?

If Annie uses one sheet of paper in the morning, and five in the afternoon, to write her story, how many sheets of paper does she use?

If you put one plate on the table, and mamma puts on five more, how many plates are put on the table?

If Nellie has five little girls to visit her on her birthday, how many little girls are there in all?

If Johnnie has one cent, and earns five more, how many cents does he earn in all?

If there is one cruet in the caster, and you put in the other five, how many cruets in the caster?

Tell me a story about one and five; another; another; another.

Exercise for Review.

If I have five letters to write, and write one a day, how many days will it take me to write them?

If Annie puts her two hands under the table, and Jamie puts his hands under the table, how many hands will there be under the table?

If Ned stands squarely on two feet, and Harry stands squarely on two feet, how many feet will rest nicely on the floor?

If there are three in your family, and you expect two more to tea, how many will there be to tea?

How many cups and saucers will it take for all? how many plates? how many knives and forks?

If you set the chairs, how many chairs will you place?

If there are four persons in your family, and one goes away to visit, then two come to visit you, and one of these goes away, how many will there be in the family?

If you have two errands to do at the grocer's, and one at the jeweller's, and one at the post office, how many errands have you to do in all? If you forget three of your errands, how many do you remember?

If you have four errands to do, and forget half of them, how many do you remember?

If you have four miles to go, and go two miles, what part of your journey have you made?

Six minus One.

Show me six blocks. We will call them ducks in a pond. Mrs. Bond went down to the pond and caught one; how many were left?

Call them boats sailing by; one takes in sail; how many go sailing on?

We will call them frogs; one has jumped into the pond; how many are left?

Call them snails creeping into their shells; one has crept in; how many are still creeping in?

Call them mice in a box; one has jumped out; how many remain in the box?

If you have six cents, and buy a stick of candy for one cent, how many cents have you left?

If there are six cakes in the jar, and you eat one, how many cakes remain in the jar?

If Annie has six stories to write, and writes one, how many more has she to write?

If there are six cows, and one jumps over the moon, how many are left?

If you have six dolls, and break one, how many are left?

If you have six torpedoes, and snap one, how many have you left?

If you have written six words, and one is wrong, so it has to be rubbed out, how many will remain?

If there are six roses on a bush, and one drops off, how many are left?

Six minus Five.

Here are six scholars in a class; five are girls; how many are boys?

There are six weekdays in the week; you go to school five days; how many days do you have to play at home?

There were six monkeys in a tree; five were small, and the rest large; how many large monkeys in the tree?

If there are six steps to go up, and you go up five, how many more are there to go up?

If Mary's doll has six dresses, and she puts away five, how many does she leave out?

If there are six stars around the moon, and a cloud covers five, how many can you see?

If you have six pins, and I take five, how many do you have?

Six apples are in a dish; five are good; how many bad?

Exercise for Review.

You may tell me a story about six minus one; five minus one; four minus one; three minus one; two minus one.

You may tell me a story about five minus two; four minus two; three minus two; two minus two.

Give me an example for what I show you. (Teacher shows different combinations and separations of numbers with the blocks, and pupil makes an example, illustrating what he sees.)

If you drop six kernels of corn into each hill, and a worm eats one, a crow eats two, and one dies, how many are left to grow?

Show me six blocks; six fingers; six marks on the board; six paper baskets; six birds.

Tell me what number I show you; now; now.

If you have six presents Christmas, and give one to your brother, how many presents have you then?

If mamma then makes you another present, how many will you have?

I have one bird's-nest in my room, and my sister has five; how many have we together?

One swallow built his nest on a beam in our barn, and five more built nests under the eaves; how many swallows' nests were there in all?

Baby is one year old to-day; how old will he be in five more years?

Nellie bought six pencils this morning, but has already broken one; how many whole ones has she?

When she has broken two more, how many will she have?

Four and Two.

Show me six blocks.

Show me four of them; show me two more. How many blocks are four blocks and two blocks? How many sleds are four sleds and two sleds? How many knives are four knives and two knives? How many flies are four flies and two flies? How many bees are four bees and two bees? How many ants are four ants and two ants?

Tell me a story about four handkerchiefs and two handkerchiefs; four sparrows and two sparrows; four cows and two horses; four hammers and two gimlets; four rakes and two pitchforks; four chairs and two tables; four books and two pencils; four maps and two pictures.

Two and Four.

Show me two blocks; now show me four more; how many blocks in all?

Show me two beads; show me four more; how many beads in all?

If there are two wheels on one carriage, and four on another, how many wheels altogether?

If a whistle costs two cents, and a top four cents, how many cents do both cost?

If your boots cost two dollars, and mine cost four dollars, how many dollars do both cost?

If a pencil cost two cents, and some paper four cents, how many cents do both cost?

It is two miles to church, and four miles more to the depot; how many miles is it to the depot?

Exercise for Review.

If you have six cents, and spend five, how many cents have you?

If you must write your words six times, and have written them five times, how many more times must you write them?

If there are six ponds in the park, and all but one have lilies in them, how many have lilies in them?

If there are six boys coasting on the hill, and all but one come in, how many come in?

If four boys are skating on the pond, and two more join them, how many are then skating on the pond?

You can sing four songs; if you learn to sing two more, how many can you then sing?

It is two miles to church; if I walk to church and back, how many miles do I walk?

How many miles is it half way to church?

If I walk half way to church, then ride the rest of the way, but walk home, how many miles shall I walk?

Show me one-half of four blocks; one-half of two blocks; one-half of six blocks.

Your slate has four sides; if the frame is gone from half the sides, from how many sides is it gone?

There are four boys in the D class; one-half of the class was absent yesterday; how many were absent?

I can pick a pint of berries in half an hour; how many pints can I pick in an hour?

One mile is half the distance I walk every pleasant day; how many miles do I walk?

What time does the minute-hand take to go round the face of the clock? What time does the hour-hand take to go half-way round the face of the clock? What part of the face of the clock does the minute-hand go round in half an hour? What part of the face of the clock does the hour-hand go round in six hours?

There are two rounds on one side of a chair, two on another side, one in front, and one behind; how many rounds on the chair?

How many sides has this room? If you count the ceiling and the floor, how many sides has it?

Six minus Two.

Show me six fingers; shut two fingers; how many fingers are open?

Show me six blocks minus two blocks. Tell me a story about six blocks minus two blocks; six horses minus two horses; six beans minus two beans; six cushions minus two cushions; six dolls minus two dolls; six books minus two books; six lamps minus two lamps; six candles minus two

candles; six postal cards minus two postal cards; six envelopes minus two envelopes; six sheets of paper minus two sheets of paper; six pints of molasses minus two pints of molasses; six plates minus two plates; six sticks minus two sticks; six umbrellas minus two umbrellas; six Christmas trees minus two Christmas trees; six presents minus two presents; six pop-guns minus two pop-guns.

Six minus Four.

Make six straight lines on the board; cross out four of them; how many are not crossed out?

Show me six o's on the board; cross out four; how many are not crossed out?

Show me six crosses on the board; cross out four of them; how many are not crossed out?

Show me six slanting lines; cross out four; how many are uncrossed?

Show me six dots; draw a line through four of them; how many have no line drawn through them?

Show me six blocks, and tell me how many blocks six blocks minus four blocks are.

Tell me another story about six minus four; another; another.

Exercise for Review.

How many eyes and ears have you? how many hands and feet?

If you must pick up your mittens and your boots, how many things must you pick up? If then you see your hat and coat lying on the chair, and pick them up, how many things do these make that you had to pick up?

If there is a bed, and two chairs, and a table, and chest of drawers in your room, how many articles of furniture in

your room? If then you have a bookcase put up, how many pieces of furniture will there be?

If there are four books on your bookcase, and two on the table, how many books are there?

If Johnny pays two cents for a pencil, and three cents for a sponge, how many cents does he pay?

If I buy two Christmas cards at two cents apiece, and another for two cents, how many cents will all three cost?

There are six parts to Harry's puzzle; he cannot find two parts; how many parts can he find?

How many legs have you and your dog together?

How many feet have you and your cat together?

How many feet and ears has your dog?

How many blinds do you see on two windows?

How many mittens make two pairs of mittens and a half a pair?

How many boots make two and a half pairs of boots?

If it takes half a minute to write half of your words, how long will it take to write the whole?

If I receive two express packages, send one back, then receive two more, how many do I keep?

If I can paint one placque in two hours, how long will it take me to paint two such placques?

Two cards and four cards are how many cards?

Three books and two books are how many books?

§ 17. THE INCH.

(Provide some stiff squares, an inch on each side.)

You may each take one of these squares.

Show me one side of your square. Who knows how long it is?

Ned says it is an inch long. *It is an inch long.*

Draw on the board a line an inch long; measure it by a side of your square so as to be sure it is an inch long.

Draw another line an inch long.

Draw an up-and-down line an inch long.

Draw a right-and-left line an inch long.

Draw a slanting line an inch long.

Here are some strips of paper marked off into squares. Find how long it is between any two marks. (An inch.)

See if it is an inch between the joints on your fingers; between the joints on your hand.

Measure this side of this block. Is it an inch long?

This side of the block. Is it an inch?

Measure this side of this card.

Measure this side of this envelope.

Measure this side of this postage-stamp; this side of this little book; an edge of this rubber; of this little box.

Measure this knife-handle; the blade; this pencil; a side of this square I draw on the board.

You may draw a line two inches long; three inches long; four inches long; five inches long.

You may guess how long this line is that I draw; this line; this line.

If it takes two inches of edging to go round one sleeve of dolly's dress, how many inches will it take to trim the two sleeves? If it takes two more inches to trim the neck, how many inches will it take in all?

Six divided by Two.

You may divide your six blocks as I divide mine.



How many in each group? How many groups of two each?

Take six paper cents, and see if you can find three twos in six. Take six sticks; take six circles; take six cards.

If you had six apples, and should put two on a plate, how many plates would you need?

If you had six cents, how many two-cent stamps could you buy? How many two-cent pencils? How many two-cent books? How many two-cent spools of thread?

If I have six boots, how many pairs have I?

If there are six horses on a stage-coach, how many spans of horses are there?

If a man has six oxen, how many yokes of oxen has he?

It takes two horses for every hack; how many hacks will six horses supply?

If you owe me six cents, and pay me in two-cent pieces, how many pieces will you give me?

If I have six half sticks of candy, how many whole sticks of candy have I?

I have six screws which I am going to put into picture-frames. I shall put two in each frame. How many frames are there?

It takes two tassels for every curtain. If I have six tassels, how many curtains can I furnish with tassels?

Three Twos.

Show me two blocks together; two more together; two more together. How many twos? How many blocks in all?

Show me two buttons; another two buttons; another two buttons. How many buttons in all?

Show me three boxes; put two cents in each box. How many cents in all?

Show me three tin plates; put two pieces of paper in each plate. How many pieces of paper in all?

If you have three pockets, and two apples in each pocket, how many apples will you have?

If you buy three pencils, and pay two cents for each pencil, how many cents must you pay?

If there are three little boys looking straight at me, how many eyes will be looking at me?

If three little boys have their hands under the table, how many hands are under the table?

How many mittens will it take for three girls?

How many wristers for James, John, and Willie?

How many skates for three boys?

If Mary writes two stories each day, for three days, how many stories will she write?

If Harry finds three hen's nests, with two fresh eggs in each nest, how many eggs does he find?

Each sheet of paper has two leaves, how many leaves have three sheets?

If each ink-stand has two wells for ink, how many wells will three such ink-stands have?

If a bottle of ink will fill two of the ink-stand wells, how many wells will three bottles fill?

Three and Three.

Each choose three things of the same kind. Choose three more like them. Who will tell me how many he has?

Who has a story for what he has shown me?

Find three squares on this chart. Find three more squares. How many squares have you found all together?

Find three stars and three stars; three rings and three rings.

Three spools and three spools are how many spools?

Three marks on the board and three marks on the board are how many marks?

Three apples and three apples are how many apples?

Three chairs and three chairs are how many chairs?

Three marbles and three marbles are how many marbles?

Tell me a story about three and three; another; another.

Exercise for Review.

Show me six blocks; six buttons; six shells; six fingers; six inch-measures.

Show me five fingers; five bits of crayon; five pieces of paper.

How many must you take away from six blocks to have four remain? to have three remain? to have two remain?

Tell me a story about six minus four; six minus two; six minus five.

Name six books you have seen.

Name six towns of which you have heard.

Name six games that you can play.

Give six stories that you can write.

Give six words that you can spell.

Name six animals that you know.

How many mittens in three pairs of mittens?

How many horses in three spans of horses?

How many oxen in three yokes of oxen?

Which will buy more peanuts, six cents or three two-cent pieces?

Which cost the more, six one-cent pencils or three two-cent pencils?

I can see three flies and two bees; how many insects can I see?

If a spider catches two flies in his web to-day and four to-morrow, how many flies will he catch altogether?

You may divide this apple into two equal parts. What part of the whole number is each part?

Divide this string into two equal parts. What part of the whole string is each part? How many halves in the whole string?

This stick is two inches long. How long is half the stick?

Six minus Three.

How many blocks have I? (Six.)

How many will you take, then?

I will give you three of my blocks; how many have I left?

Nellie, you may give Harry three of your blocks; how many have you left?

Jennie, you may give me three of your six blocks; how many have you left?

Tell me a story about six chickens minus three chickens; six sheets of paper minus three sheets of paper; six books minus three books; six plates minus three plates; six spoons minus three spoons; six bonnets minus three bonnets; six dollars minus three dollars; six umbrellas minus three umbrellas; six baskets minus three baskets; six marbles minus three marbles; six watches minus three watches.

Six divided by Three.

Show me six blocks. Divide your blocks as I divide mine.



How many here? here? How many threes?

Take six blocks of another kind. See if you can find how many three-blocks in six blocks. How many do you find?

Take six crayons and put three on a board. How many boards can you put them on?

Here are six cows. Put three in a pen. How many pens does it take?

If I have six cents, how many three-cent postage-stamps can I buy? how many three-cent books? how many three-cent pencils? how many three-cent rubbers?

If I have six books, and put three on a shelf, how many shelves will it take?

If there are six sticks of wood in the box, and you put three in the stove at once, how many times can you put three in the stove before they are gone?

If there are six little girls, and three walk in each row, how many rows of girls?

Exercise for Review.

If two boats start at the same place, and one rows up the river three miles, and the other rows down the river three miles, how far apart are the two boats?

If a spider in spinning his web spins a thread three inches in one direction and three inches in the opposite direction, how far across is the web?

If two men are six miles apart, and walk towards each other three miles, how far apart are they then?

Here are six pencils; two of them are too short to use, and three others are too blunt to write well. How many are in a good condition?

I have two hens, a duck, and a goose; how many fowls have I?

Ned has three tame rats, two rabbits, and a young fox; how many pets has he?

If there are six hoods on the chair, and Annie hangs up three of them, how many are left on the chair?

If you must bring in four baskets of wood, and have already brought in two, how many more must you bring in?

If you must pick up your doll, put away your blocks, sweep the room, and set the chairs in order, how many things must you do?

In one nest there are four eggs, and in another two eggs. If I leave the nest-egg only in each nest, how many eggs shall I take away?

Two Threes.

Show me three blocks.

Show me another three blocks.

How many threes? Your two three-blocks are how many blocks?

Take three spools and another three spools. How many threes? How many spools in all?

Show me three blocks in each of your two hands. How many threes do you show me? How many blocks?

I have three buttons on each pocket. How many buttons have I on my two pockets?

There are three dots on each of these two cards. How many dots in all?

If a sponge costs three cents, how many cents will two sponges cost?

If Ellen writes three i's on each line, how many will she write on two lines?

If there are three rings on each finger, how many rings on two fingers?

Exercise for Review.

Point in four directions; point in two more directions. In how many directions have you pointed?

Put a block on each corner of the table. How many blocks does it take?

Take two shells in each hand. How many shells have you?

Every chair has a seat, four legs, and a back. How many parts has every-chair?

If Jamie has six marbles, and loses two, then buys two more, how many marbles has he?

If Nellie writes four words, erases three words, then writes three more words, how many words has she on her slate?

If Mabel has some pennies, and spends four, then earns four, how many more pennies has she than at first?

If I have five dollars, and spend three, then receive four, how many more have I than at first?

You may arrange six dots on the board in all the ways you can.

You may arrange six lines on the board in all the ways you can.

Read what I show you; read again; read again.

Make up a story from what I show you with the blocks.

Make up a story from what I show you on the board.

You may tell me any story you know about six, and I will illustrate it on the board. Tell me another; another.

* I will give you an example, and you may illustrate on the board what I tell you.

Ned has illustrated five examples, and Mamie three. How many more has Ned illustrated than Mamie?

Six minus Six.

If I have six cents, and buy a six-cent loaf of bread, how many cents have I left? Show me with your blocks.

If there are six rolls on the plate, and if six of us take each a roll, how many rolls are left?

I will give you these six cents. You may buy me six one-cent stamps; how many cents have you left?

If a lady has six peppermints, and she gives to each of six little girls one peppermint, how many will she have left?

Six oranges minus six oranges are how many oranges?

Six spiders minus six spiders are how many spiders?

Six elephants minus six elephants are how many elephants?

* If the teacher is judicious in her examples, and encouraging in regard to the illustrations, this is one of the most profitable exercises in Arithmetic.

Exercise for Review.

If I have no money, and no one gives me any money, how much money shall I have?

If James has no words on his slate, and writes no words on his slate, how many words will there be on his slate?

If there are no blocks on the table, how many blocks can you take from the table?

If there are no apples in the dish, how many apples can you take from the dish?

If there are no hats or coats lying around, how many hats and coats will there be to pick up?

If there are no oranges in town, how many oranges can I buy in town?

If there are no mistakes on your slate, how many mistakes will you have to correct?

If no May-flowers have blossomed, how many May-flowers can you find?

If there are no books on the desk, and I put four books on the desk, how many books will there be on the desk?

If there is no milk in the pan, and I put three pints of milk in the pan, how much milk will there be in the pan?

If three little girls have each two pencils, how many pencils have they together?

If each girl has one pencil, how many pencils have they?

If each girl has no pencil, how many pencils have they?

If each of four boys had no cents, how many cents would all have?

If one velocipede has three wheels, how many wheels have two velocipedes?

How many chairs in two chambers, if there are three in each chamber?

Six divided by One.

Take six buttons; put each on a plate by itself. How many plates does it take?

Here are six cups; put each in a saucer by itself. How many saucers does it take?

Here are six spoons; put each in a saucer. How many saucers are required for the six spoons, with each one in a saucer by itself?

Here are six cents; give one cent to each little girl until they are all given away. To how many little girls can you give them?

I have six curtains. I shall put one at a window. How many windows will they supply?

There are six horses in a stable; each is in a stall by itself. How many stalls do they take?

I have written six stories. If now I draw a picture to illustrate each story, how many pictures must I draw?

Exercise for Review.

Draw a line on the board one inch long.

Draw another line, two inches in length.

What part of the last line is the first?

Draw a line twice as long as the last line.

What part of the last line is the two-inch line?

Draw a line three inches long.

Draw another line twice as long.

What part of the last line is the three-inch line?

Show me a line four inches long.

Show me a line half as long as the four-inch line.

Show me the line that is six inches long.

Point to a line half as long.

The one-inch line is half as long as what other line on the board?

The three-inch line is equal to one-half of what line?

Six Ones.

Take six blocks. Put them as I put mine. (Teacher separates hers into ones.)

How many ones have you?

How many blocks altogether?

Show me six shells, with a pebble in each shell; how many pebbles do you show me?

Show me six cards, with a dot on each card; how many dots?

If there are six wagons front of the market, and a driver in each wagon, how many drivers are there?

If Amy learns a word each day for six days, how many words will she have learned?

If six of us have each an orange, how many oranges have we together?

If six boys have each a sled, and put them together in line, how many sleds will be in line?

If six little girls agree each to make an apron for the fair, how many aprons will they make for the fair?

If six little girls agree each to dress a doll, how many dolls will they dress?

If I write my name on each of six visiting cards, how many times must I write my name?

Who will tell me a story about six ones?

Six divided by Six.

I have six apples. I wish to give six apples to as many little boys as I can. Who will tell me to how many little boys I can give them, giving six apples to each?

If you have six cents, how many tops at six cents each can you buy? How many cards at six cents each? How many toy balloons at six cents each?

A car ticket costs six cents; how many car tickets can you buy if you have only six cents?

Exercise for Review.

You may divide this square into two equal parts; this circle; this triangle; this string; this splint; this line.

Draw a line dividing this blackboard into two equal parts.

Divide four blocks into two equal parts; into four equal parts.

Divide five blocks into five equal parts.

Divide three blocks into three equal parts.

Divide six blocks into six equal parts; into three equal parts; into two equal parts.

If car tickets are three cents apiece, how many can you buy for six cents?

How many postage-stamps at three cents each can you buy for six cents?

How many days will it take for you to earn six cents, if you earn three cents a day?

If Mary hems three handkerchiefs in a week, how many weeks will it take her to hem six handkerchiefs?

If she hems only two a week how many weeks will it take her to hem six?

If Ellen writes two words a minute, how many minutes will it take her to write six words?

A pint of milk costs two cents, how many pints will six cents buy?

It requires two boys to steer a sled; how many sleds can six boys manage?

If it required only one boy to steer each sled, how many could six boys manage?

How many one-cent stamps will six cents buy?

How many one-cent rolls will six cents buy?

If Nellie learns one stanza a day, how many days will it take her to learn six stanzas?

If I have six cups to paint, and I paint one a day, how many days will it take me to paint the six cups?

How many six-cent cards can I buy for six cents?

How many three-cent cards?

How many two-cent cards?

How many one-cent cards?

How many five-cent cards? and how many cents will remain?

How many four-cent cards? and how many cents will remain?

Halves of Six.

Show me six splints. Give me half of them. How many do you give me?

I have six cents. If I spend half of what I have, how many cents do I spend? How many cents have I left? What part of six cents are three cents?

Mary has six sheets of paper; Annie has only half as many sheets; how many sheets of paper has Annie?

The cook uses six eggs to make a pudding, and half as many to make a loaf of cake; how many eggs does she use for cake?

Nellie is in school six hours a day; her little sister is in school only half as many hours; how many hours is her sister in school?

I work six days in the week; my sister works half as many days; how many days does she work?

Exercise for Review.

Show me one-half of six blocks.

How many blocks are one-half of six blocks?

How many apples are one-half of six apples?

How many oranges are one-half of six oranges?

I have here six nuts. Belle, I will give you half of them if you can tell me how many that number is.

Johnny started with six eggs from the store, but broke half of them before he got home. How many did he break? How many had he left?

Three bonnets are what part of six bonnets?

You have shown me one half of six; show me two halves of six.

How many blocks in two halves of six blocks?

How many apples in two halves of six apples?

How many cents in two halves of six cents?

How many nuts in two halves of six nuts?

How many balls in one half of six balls? in two halves of six balls?

If I divide six cards equally between two girls, how many shall I give to each girl? What part of the whole number will each have?

§ 18. COMPARISON OF SIX WITH NUMBERS KNOWN.

One hen had six chickens, another five; how many more did the first have than the second?

I have here two three-cent stamps, and here two two-cent stamps and a one-cent stamp. Which cost the more? How much more?

Mary has six cents; I have four. Which has the more? How many more has Mary?

Which have more legs, three boys or a chair? two boys or a chair? two boys or a dog? two boys or a hen?

These six postal cards cost a cent apiece; this bunch of envelopes four cents. Which cost more cents? How many more cents?

Here are three two-cent coins, and a five-cent coin; which is worth the more? How much more?

Mira writes six stories on her slate while Harry is writing three. Which writes the more stories? How many more does Mira write?

In one half a window, a man puts six panes of glass; he has four panes already set; how many more has he to set?

I have written six letters, and I find I have only four envelopes; how many more do I need?

In a half-dozen there are six things; in a quarter of a dozen three things. Which had you rather have, a half-dozen sticks of candy, or a quarter of a dozen?

One basket has in it a half-dozen eggs, and another a quarter of a dozen. How many more has the one than the other?

A quire of one kind of paper costs six cents, and a quire of another kind four cents; which costs the more?

Your mother pays six cents a pound for flour, and two cents a pound for meal. How much more does the flour cost than the meal?

Your father pays six dollars for his boots, and two dollars for your boots. How much more does he pay for his own boots?

Milk is six cents a quart in the winter, and four cents a quart in the summer. How much more does milk cost in the winter than in the summer?

Two little girls were hunting for pins. One found six, and the other found one. How many more did one find than the other?

Two little boys were bouncing ball. One missed six times, and the other once. How many more times did one miss than the other?

Show me six blocks in a row.

Show me right below them five in a row.

Right below the five, four blocks in a row.

Show me three in a row; two in a row.

Show me one beneath them all.

Which row has the most?

How many more in the six-row than in the row below it?

How many more in the five-row than in the row below?

How many more in the three-row than in the row below?

How many more in the two-row than in the row below?

How many must you put with one to make two?

How many must you put with two to make three?

How many must you put with three to make four?

How many must you put with four to make five?

How many must you put with five to make six?

Show me six dots on the board; put below them one dot.

How many more dots in six dots than in one dot?

Tell me a story about this.

Show me another six dots on the board; put below them two dots.

How many more in six than in two?

Tell me a story about this.

Show me six dots with three dots below them.

How many more in the six than in the three?

Tell me a story about this.

Show me six dots with four dots below them?

How many more in the six-row than in the four-row?

Tell me a story about this.

Show me six dots with five dots below them.

How many more in six than in five?

Tell me a story about this.

I have here five pencils. I own six pencils. How many more have I than I show you?

I have five cents in my pocket. I need six cents to make change. How many more cents must I have?

Two drawers have four handles; three have six handles. How many more handles have three drawers than two drawers?

Willie has learned four words, George six. How many more words has George learned than Willie?

A fly has six legs. How many more legs has a fly than a mouse?

John has told me three things a bird can do ; Mamie has told me six. How many more things did Mamie think of than John?

Mary has six dolls ; Lena half as many. How many more has Mary than Lena?

A pint of milk costs three cents ; a quart six cents. How much more does a quart cost than a pint?

Ned had but two cents, and wanted a six-cent book. His father told him he might have the book if he could tell him how many more cents he needed to buy it. How many more cents did he need?

A little girl has filled two salt-cellars. She had six to fill in the first place. How many more has she to fill?

She has put two plates on the table. How many more must she put on to have six on the table?

Susie is two years old. In how many years will she be six years old?

Tottie is a year old. In how many years will she be six years old?

Nellie is five years old, and Jennie one year old. Which will have her sixth birthday first?

James and Susie each earn a cent a day. James has already earned four cents, and Susie three. Which must work more days to earn six cents? How many more days?

Six minus one are how many?

Six minus two are how many?

Six minus three are how many?

Six minus four are how many?

Six minus five are how many?

Six minus six are how many?

Five and one are how many?
 Four and two are how many?
 Three and three are how many?
 Two and four are how many?
 One and five are how many?
 Five and how many are six?
 Four and how many are six?
 Three and how many are six?
 Two and how many are six?
 One and how many are six?
 How many and one are six?
 How many and two are six?
 How many and three are six?
 How many and four are six?
 How many and five are six?
 Three twos are how many?
 Two threes are how many?
 Six ones are how many?
 How many ones in six?
 How many twos in six?
 How many threes in six?
 How many sixes in six?
 Count by twos to six.
 Count backward by twos from six.
 Five are how many more than three?
 Six are how many more than two?
 Two are how many less than five?
 Five are how many less than six?
 Five are how many more than two?
 Four are how many more than one?
 One is how many less than six?

Copy :

●	● ●	● ● ●	● ● ● ●	● ● ● ● ●	● ● ● ● ● ●
one.	two.	three.	four.	five.	six.

Pints in a Quart.

Look at these measures. (Pint and quart measures.)
Who knows what this is called? what this is called?

Here is some water. I will fill the pint measure, and pour the water into the quart measure. Does it fill it? I will fill the pint measure again, and pour the water into the quart measure. Is the quart measure full now?

How many times did I fill the pint measure?

How many pints of water does it take to make a quart of water?

Annie may find how many pints it takes to make a quart.

Ned may find how many pints it takes to make a quart.

Susie may find how many pints it takes to make a quart.

How many pints of water make a quart of water?

How many pints of milk make a quart of milk?

How many pints of molasses make a quart of molasses?

How many pints of oil make a quart of oil?

You may write on your slates, "Two pints of water make a quart of water."

If there is a quart of water in a pail, how many pint measures will it take to hold the water?

It takes half a pint of molasses for one loaf of gingerbread. I have used a quart of molasses in making gingerbread; how many loaves have I made?

Mary drinks a half pint of milk every morning. How much will she drink in four mornings?

It takes a pint of milk to make one bowl of custard. How many bowls of custard can I make from a quart of milk?

If a quart of water weighs two pounds, how much will a pint of water weigh?

If one quart of berries costs six cents, what will a pint of berries cost?

If a quart of milk costs six cents, what will a pint of milk cost?

If I pick a pint of berries in half an hour, how long will it take me to pick a quart?

I give my chickens a pint of dough every morning. In how many mornings shall I give them a quart?

If two pints of peanuts cost six cents, what will a quart of peanuts cost?

If a quart of paint is required to paint a fence, how many pints will it take to paint the fence?

If a baker bakes a quart and a half of beans in a pot, how many pints does he bake in a pot?

How many pints in three quarts? in two quarts?

In six pints how many quarts?

In five pints how many quarts, and what part of a quart over?

In four pints how many quarts?

In three pints how many quarts, and what part of a quart over?

In one-half of six pints how many quarts, and what part of a quart over?

In one-half of four pints how many quarts?

One-half of two pints is what part of a quart?

Two halves of two pints are how many quarts?

If a horse eats two and a half quarts of corn for his dinner, how many pints of corn does he eat?

A two-quart pail lacks one pint of being full; how many pints are in the pail?

Two half-pint cups of water are poured into a three-pint measure; how many pints of water will be required to fill the measure?

CHAPTER VI.

THE NUMBER SEVEN.

§ 19. SEVEN AS A WHOLE.

Show me six blocks.

Put one more with them.

You have shown me seven blocks.

I will show you just as many as you have shown me.

How many do I show you?

Take six cards; now take one more card.

How many cards have you?

Show me seven fingers; seven pieces of paper; seven blocks; seven words on the board; seven i's on this slate; seven desks; seven panes of glass; seven bits of crayon; seven paper patterns; seven joints on one hand; seven buttons on your jacket; seven splints.

Make seven dots on the board; seven straight lines; seven triangles; seven crosses; seven squares.

Who has seen seven houses? seven horses? seven persons? seven children? seven cars? seven trees? seven steps? seven books? seven slates?

Where have you seen seven things, Annie? Mary? Susie? Belle? Mamie?

Name seven things in this room; seven things in the parlor at home; seven animals; seven birds; seven kinds of fruit.

Copy the word seven.

§ 20. DISCOVERIES IN SEVEN.

Who can do something with seven?

What have you done?

Who can do something else?

Tell me what you have done.

Who can do something else?

Who can do something else?

What can you take away from seven?

How many have you left?

What else can you take from seven?

How many have you left?

What else can you take away from seven?

How many have you left?

Arrange seven dots on the board, all the ways you can.

Exercise for Review.

Show me a line an inch long.

Draw a square an inch on each side.

Draw a figure on the board having the ends an inch in length, and the other sides two inches each in length.

Draw a figure having six sides, and each side an inch long.

Draw a square an inch on each side, and have a corner point toward each side of the board.

Draw a line two inches long, and divide it into halves.

Draw a line four inches long, and divide it into halves.

I had several errands to do this morning. I had time for only four, but I shall do the other two at noon. How many errands had I to do in all?

Nettie had several cents when she started for school this morning. She spent four for a sponge, and has three left. How many did she have at first?

Ned has just so many things to do every morning; when he has done three, he can say, "Now I have only three more to do." How many things has he to do in the first place?

Willie drives the cows from the pasture every night. Three are usually at the bars, but the other two stay to feed. How many has he to drive home in all?

There was a number of street-cars standing in a row; after four moved on, two remained. How many were there at first?

If one log will make four planks, how many planks will a log and a half make?

If a driver hauls four loads of wood a day, how many loads will he haul in a day and a half?

If it takes a yoke of oxen and a horse to draw one load, how many animals does it take?

If there are three loads of wood on the street, each drawn by a yoke of oxen, how many oxen are required to draw the wood?

How many panes of glass in a window that has three panes across, and two up and down?

I divided six apples equally among two boys. How many apples did I give to each?

I divided six cents among some boys, giving two to each boy. To how many boys did I give them?

§ 21. FACTS IN SEVEN.

Six and One.

Harry may give me six watches. Alice may give me one more watch. Who will tell me how many watches I have?

Nellie may give me six pitchers. Arthur may give me one more pitcher. How many pitchers do I have?

Six red rings and one blue ring are how many rings?

Point to a group of six stars on the chart. Point to one more star. To how many stars have you pointed ?

Six *i*'s and one *i* are how many *i*'s ?

Tell me a story about six and one.

Tell me another ; another ; another ; another ; another ; another.

Write : Six and one are seven.

One and Six.

Show me seven blocks.

Show me one of them ; show me the rest. How many are there ?

One block and six blocks are how many blocks ?

One button and six buttons are how many buttons ?

One horse and six horses are how many horses ?

One boy and six boys are how many boys ?

One picture-book and six picture-books are how many picture-books ?

Tell me a story about one and six.

Exercise for Review.

I paid six cents for a spool of thread and a paper of pins. The paper of pins cost four cents ; what did the spool of thread cost ?

There were six at table this noon, and each had a chicken-leg. How many chickens must there have been ?

How many of us might have had a wing ?

If one ate two wings, how many wings were left for the others ?

How many wish-bones were there to distribute among us ?

What part of the number at the table could have wish-bones ? how many could have a chance to wish ?

John earns a cent a day. Monday he finds he has four cents with the cent he earned that day. On what day will he have six cents?

If he then spends three cents, on what day will he again have six cents?

If then he buys two pencils, at two cents each, on what day will he again have six cents?

How many more cents can he earn that week?

A boy receives a cent for every half-dozen newspapers he sells. How many half-dozen newspapers must he sell to earn six cents? how many dozen newspapers?

I bought two lemons, at two cents apiece, and gave a five-cent piece in payment. How much money ought I to have received in change?

Tell me all the pairs of numbers which, put together, will make the number six; all the pairs of numbers which, put together, will make the number five; all the pairs of numbers that will make the number four.

I have one Christmas-card, and Ellen has six; how many have we together?

I bought a one-cent stamp this morning, and two three-cent stamps; how much money did I spend?

If I had bought two three-cent stamps and a one-cent stamp, how much should I have spent?

There were three cows in the pasture; one cow had no horns. How many horns did the three cows have?

A cow has no upper front teeth; how many upper front teeth have seven cows?

Annie has two dolls, and Mary four dolls; how many dolls must Mary give Annie that they may each have the same number?

James has three cents, and his sister one cent; how many cents must James give his sister that each may have the same number of cents?

I have five shells, Ned has one; how many shells must I give Ned that we may each have the same number of shells?

I guessed that a package weighed four ounces, and Joe guessed it weighed three ounces. It weighed three ounces and a half. Which made the better guess?

Seven minus One.

Who will find seven things on the table first?

Do as I do. (I put one under the table.)

How many have you taken away?

How many have you left on the table?

Tell me a story about this.

Tell me another story about this; another; another; another.

If there are seven men walking along the street, and one loses his hat, how many men have hats on?

If you have seven paper dolls, and one is swept into the fire, how many will you then have?

Annie owned seven doves, but one died; how many did she then have?

There are seven cattle in the pasture; one of them is lying down, the rest are feeding. How many are feeding?

Exercise for Review.

Read what I show you with the blocks.

Read what I show you with the dots on the board.

Ed had six hens, but sold half of them; how many did he have left?

After Nettie had spent half her money, she had three cents; how much did she have at first?

After Willie had copied three words, he had just as many more to copy; how many did he have to copy in all?

After Lizzie had copied two words, she had twice as many more to copy ; how many words did she have to copy altogether?

Mary has six words to learn, Jane four words; how many more words has Mary to learn than Jane?

One-half of six is how many more than one-half of four?

One-half of four is how many more than one-half of two?

One-half of six is how many more than one-half of two?

I guessed it took six hours to go to New York, and George guessed it took four hours. Neither was right, but one was just as nearly right as the other; how many hours did it take?

After John had brought in one armful of wood, he had three times as many more to bring in; how many armfuls did he have to bring in at first?

Ruth has a strip of paper six inches long which she wishes to cut into strips two inches long. How many times must she cut the paper? How many strips will she have?

Seven minus Six.

Take seven blocks. Put six under the table. What have you left on the table?

I had seven children with their hands under the table a moment ago; now six of them have their hands on the table; how many have hands under the table?

There are seven days in a week; we work six days; how many days have we for rest?

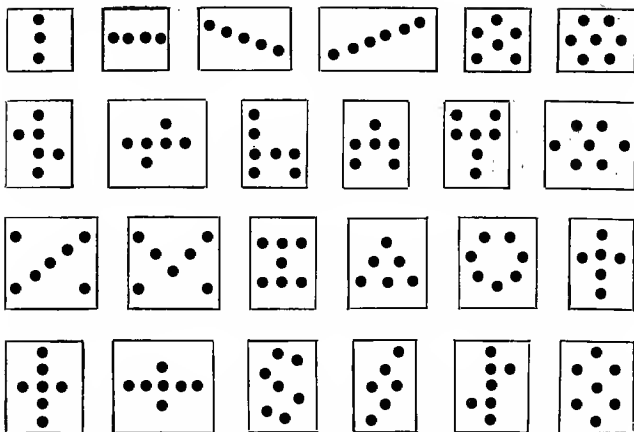
There are seven windows on the side of a house; six are arranged in pairs; how many are there besides the six arranged in pairs?

If Mary bought three pears, at two cents each, and gave in payment for them a five-cent piece and a two-cent piece, how much money should she receive back?

Tell me a story about seven minus six.

Exercise for Review.

Tell the number of dots as I point.



Make an example for what I show you with the blocks.

Mary may give examples for the class.

I have a ball which is two inches through; if it is three times as far round the ball, how large round is the ball?

On Nellie's sixth birthday she had six little girls to tea; how many little girls were there then?

If she is six years old now, how old will she be a year from now? How old was she her last birthday? How many years ago was she half as old as she is now?

If a train moves a mile in two minutes, how many miles will it move in six minutes? what part of a mile in one minute?

If a horse is five years old, in how many years will he be six years old?

If Maggie picks a pint of berries a day, how many quarts of berries will she pick in a week?

Five and Two.

Take seven blocks. Put them in groups of five and two. Five blocks and two blocks are how many blocks?

One of two girls had five books, the other had two; how many books had they together?

John had five brown rabbits and two white ones; how many rabbits had he?

A little boy going to school met five of his playmates, who walked to school with him; on their way they met two of their classmates going fishing. How many of his school-mates did the boy meet?

Annie was to have a birthday party; she had two sisters, and her mother told her she might invite five of her friends. How many were there at the party beside herself?

Some boys coasting down hill had fastened five sleds together, when two more boys came along each with a sled; when these were joined, with how many sleds did they start down hill?

Frank's mother wished him to do an errand for her; before he could go, he had to find his hat, which took five minutes, and his mittens, which took two minutes more. How long before he was ready to do his errand?

Frank made five sail-boats for his sister, but as part of them were lost in sailing, she got him to make her two more, without sails; how many boats in all did Frank make?

George played ball a certain number of times; his side was beaten five times, and the other side was beaten by his two times; how many games did he play in all?

A boy was sent to pick a pailful of plums; wishing to show how many he had picked, he turned them into two measures, which just held them, one containing five quarts, the other two quarts. How many quarts did he pick?

Exercise for Review.

If Harry gives me one cent, Mary gives me two cents, Jamie gives me three cents, and Nellie one cent, how many cents will I have?

Two pencils and three pencils and two more pencils are how many pencils?

Five birds are in a tree; two birds fly away, then three birds fly away; and then four birds fly into the tree. How many birds are in the tree?

Seven crows were on the ground; one of them flew away, and four flew into a tree; afterwards two of the four crows flew down upon the ground, and then the other two flew down. How many were on the ground then?

Write what I show you. (Have the operation which is shown expressed in *words*, on board or slate, thus: One and two are three; Four minus one are three.)

In a class of seven children there is only one girl; how many are boys?

If two boys and two girls and two dogs are running in the field, how many are running in the field?

On one twig there were five cherries, and on another two cherries; how many cherries were on both twigs?

If one-half of four sheep have two lambs each, and the other half have one lamb each, how many lambs are there in all?

Two and Five.

George has two marbles, and John has five marbles; how many marbles have both?

Annie has two apples, and Susie has five apples; how many apples have both?

John went fishing twice last week. The first time he caught only two fish, but the next time he caught five; how many fish did he catch in all?

Yesterday Annie's aunt gave her two cents, and her uncle gave her five cents; how much money had she then?

George sawed two sticks of wood this morning, and five more this afternoon; how many sticks of wood did he saw?

In my new picture-book there is a picture of two kittens running after a ball, and five more asleep on a rug; how many kittens are there in all?

The other morning Addie saw two birds in one tree, and five in another; how many birds did she see in all?

There are two blocks on my desk, and five blocks on Susie's; how many blocks are there in all?

Exercise for Review.

If a little house-fly should lose four of its legs, how many legs would it then have?

I have a little paper measure which is six inches long; if I cut off two inches, how long will it be?

Addie has six splints with which to make figures to-day; yesterday I gave her but four; how many more has she to-day?

Six children were drawing on the board, but two have taken their seats; how many remain at the board?

How many quarts will a six-pint pail contain?

How many pairs of legs has a house-fly?

How many legs has he on a side?

If there were five boys skating on the pond, and two more came to join them, how many boys would be on the pond?

If George, in skating, fell down five times, and then two times more, how many times did he fall down?

I have a five-cent piece and a two-cent piece; how much money have I?

I have a three-cent piece, a two-cent piece, and one cent; how much money have I?

If I owe you seven cents, and pay you in two-cent pieces, as far as I can, what else must I give you? How many two-cent pieces do I pay you?

If I owe you six cents, and give you three pieces of money in payment, what can the pieces of money be? What else can the pieces of money be?

If I paid you with two pieces of money, what could the pieces be? What else could the pieces be?

If I paid you with six pieces of money, what would the pieces be? If I paid you with five pieces of money? If I paid you with four pieces of money?

Three two-cent pieces are how much money?

A three-cent piece, a two-cent piece, and one cent are how much money?

Two three-cent pieces are how much money?

A five-cent piece and one cent are how much money?

A two-cent piece and four cents are how much money?

A three-cent piece and three cents are how much money?

Seven minus Two.

Ned had seven fish-hooks, but lost two; how many had he left?

It rained two days last week; how many days were pleasant?

Seven cousins were invited to a picnic; two could not go. How many went?

If I have seven nuts, and crack two, how many whole nuts have I then?

If I make seven snow-balls, and throw two, how many have I left?

The cook has seven pies in the oven. If she takes out two, how many will be left in the oven?

There were seven pins on the carpet. Susie picked up two. How many pins were left on the carpet?

Uncle Ned had seven pennies in his pocket. He gave two to Willie. How many had he left?

There were seven apples on one branch; two fell off. How many were left on the branch?

Ned was at home only two days last week; how many days was he away?

There are seven lamps in a room; two are not lighted. How many are lighted?

There are seven sleighs on the street; two have no bells. How many have bells?

You may tell me a story about seven minus two.

Write on your slate: Seven minus two are five.

Illustrate in all the ways you can that seven minus two are five, by drawings on your slate.

Exercise for Review.

Tell the number of dots as I point. (See p. 94.)

Make an example for what I show you. (See p. 61.)

I will give you examples, and you may show me what is meant.

Write on your slate what I show you. (This is just the same as the reading, only the fact is written instead of spoken.)

Read what you have written.

Name all the numbers less than seven.

Name a number that is three more than two; that is three more than three; three more than one.

Name a number that is two more than four; that is two more than five; two more than three; two more than one.

Name a number that is four more than two; four more than one.

Three and three are how many?

Two and two are how many?

If half of six blocks are taken away, what part of the six blocks will be left?

Name a number that is two less than six; two less than five; two less than seven.

Name a number that is three less than five; three less than four; three less than six.

Seven minus Five.

Paul caught seven butterflies, but let five fly away; how many butterflies had he left?

Johnny goes to school five days in the week; how many days does he stay at home?

Tom picked seven quarts of blueberries, but sold five quarts; how many had he left?

Mary has seven brothers and sisters. She has five brothers; how many sisters has she?

Minnie's geranium had seven blossoms, but she picked five; how many blossoms had she left?

Susie had seven paper dolls, but her baby brother spoiled five; how many paper dolls had she left?

Tim had seven oranges, but gave away five; how many oranges had he left?

Charlie goes seven miles to see his grandmother. He rides five miles, and walks the rest of the way; how many miles does he walk?

Mattie had seven birthday and Christmas cards. Five were Christmas cards; how many were birthday cards?

Seven kittens are playing in the yard. Five are gray, and the rest white; how many are white?

The Gill.

Who has seen a little cup like this at home?

Who has seen a little cup like this at the tin-shop?

What do you call such a cup?

Who ever picked a gill of berries? bought a gill of peanuts? drank a gill of water at one time? bought a gill of yeast at the baker's?

You may write the word gill on your slate.

Look at this. (Pint measure.) What do you call it? Which will hold more, the gill or the pint measure?

For which will you have to pay more, for a gill of nuts or for a pint of nuts? for a gill of milk or for a pint of milk? for a gill of vinegar or for a pint of vinegar?

Gills in a Pint.

Nettie may fill the gill cup with water. Pour it into the pint measure. Is the pint measure full?

Put another gill of water in the measure.

How many gills are in the measure now? Is it full?

Put another gill in the measure.

How many gills does it take to fill the pint measure?

Johnny may measure and see if it takes four gills of water to make a pint of water.

In a pint of milk how many gills of milk?

In a pint of vinegar how many gills of vinegar?

In a pint of yeast how many gills of yeast?

In a pint of molasses how many gills of molasses?

Johnny picks berries in a gill cup; how many times must he fill it to have a pint of berries?

If your mother uses a gill of yeast each time she makes bread, how many times can she make bread from a pint of yeast?

If it takes two gills of molasses to make a loaf of gingerbread, how many loaves can be made from a pint of molasses?

A coffee-cup holds half a pint; how many gills does it hold?

A saucer holds half a pint; how many gills does a saucer hold?

I have a mug which holds half a pint; how many gills does it hold?

Two gills are what part of a pint?

If I put two gills of water in a pint measure, how near full is it?

If there is only one gill of milk in a pint measure, how many more gills can I put in it before it is full?

You may write on your slates: Four gills make one pint.

Exercise for Review.

If one spool of thread costs two cents, what will three spools cost?

If I have seven cents, how many cents shall I have left after paying for the three spools of thread?

In a group of seven stars two are so faint that I can scarcely see them; how many can I see plainly?

Seven children are busy at the table. Five are building block-houses, and the rest are laying sticks; how many are laying sticks?

Those who were laying sticks, and three of the others, have gone to their desks; how many remain at the table?

The two who remained at the table, and four others, have now gone to the board to draw; how many are drawing at the board?

In two years more Nellie will be seven years old, and Jessie five; how much older is Nellie than Jessie now?

Four and Three.

Katie made four fans, and Jessie made three; how many did they both make?

Harry caught four trout, and Tom caught three; how many did both catch?

Jamie had four bunches of grapes, and picked three bunches; how many bunches had he then?

Annie has four yards of ribbon, and Mary has three; how many yards of ribbon have they together?

Charlie's father has four horses, and Lena's father has three; how many horses have both?

Johnny picked four cherries and afterwards three cherries; how many cherries did he pick in all?

Susie swept four rooms, and Rose swept three rooms; how many rooms did they sweep in all?

Frank skated four miles Wednesday and three miles Thursday; how many miles did he skate in all?

Ned found four eggs in the barn, and Isaac three; how many eggs did they find together?

Three dogs were chasing four foxes; how many animals were running?

Fanny cut out four cookies, and Belle cut out three; how many cookies did both cut out?

Joe rolled four marbles, and George rolled three; how many marbles did both roll?

Exercise for Review.

If Mary has five cents, and I have two, and Mary gives me one cent, how many cents will each have?

If Louis has seven cents, and I five, and Louis gives me one cent, how many cents will each have?

If two men are six miles apart, and each walks toward the other two miles, how many miles are they apart then?

Ina has seven cents, Ellen five. Jennie has more than Ellen and less than Ina. How many cents has Jennie?

In a bird's nest there are seven birds; five are little birds, the rest are old birds; how many are old birds?

Kittie has seven cousins, and Ralph has five; how many more cousins has Kittie than Ralph?

Mamie has seven dolls, but Charlie has hidden five; how many has Mamie to play with?

If Albert throws four snow-balls, and Cyrus throws three, how many snow-balls do both throw?

Write on your slates the word that stands for the number which I show you.

Mary picked four quarts of blueberries, and Lucy three; how many did both pick?

What will a quart of milk cost at three cents a pint?

What will a quart and a half of milk cost at two cents a pint?

If a gill of peanuts cost two cents, what will half a pint of peanuts cost?

If half a pint of syrup cost six cents, what will a gill of syrup cost?

George earns two cents every other day in the week, and Harry earns one cent every day. Which earns the more money in a week?

There is a group of stars called the dipper; four stars form the handle and three others the cup; how many stars are there in the dipper?

If there were four showers last week, and three this week, how many showers were there in all?

Divide seven into two such groups that there will be one more in one group than in the other group.

Divide seven into three such groups that one will be larger by one than either of the other groups.

Three and Four.

A hen has three white chickens and four black chickens; how many has she in all?

If I have three nuts, and Johnny gives me four, how many nuts have I then?

Charlie brings in three armfuls of wood, and Bertie brings in four; how many do both bring in?

If there are three boys skating on the pond, and four more come to join them, how many are then skating?

If three boys are riding on a sled, and four more jump on, how many are then on the sled?

If Katie slides down hill three times in the morning, and four times in the afternoon, how many times does she slide down hill?

Susie found a nest with three eggs in it, and Amy a nest with four eggs in it; how many eggs did both find?

If I ascend three rounds of the ladder, and there are four more to ascend, how many rounds has the ladder?

Exercise for Review.

Seven minus six are how many?

Seven minus what number leaves one?

What number minus six leaves one?

Seven minus five are how many?

Seven minus what number leaves two?

What number minus five leaves two?

Seven minus two are how many?

Seven minus what number leaves five?

What number minus two leaves five?

Two and five are how many?

Five and two are how many?

Two and what number are seven?

Five and what number are seven?
What number and two are seven?
What number and five are seven?
Four and three are how many?
Four and what number are seven?
What number and three are seven?
Three and four are how many?
Three and what number are seven?
What number and four are seven?

Seven minus Three.

There were seven rolls on the plate; after three were taken how many remained?

Nellie is knitting a wrister; she knits seven times round it every day; when she has knit round it three times how many more times has she to knit round it?

I am at home three days in the week; how many days am I away from home?

We have seven weeks' vacation in the summer; if I work three weeks, how many weeks have I for rest?

If Ralph must learn to spell seven words, and has learned to spell three, how many more has he to learn to spell?

If you have seven cups and saucers to wipe, and have wiped three cups and saucers, how many more must you wipe?

Seven children were making clay balls; three have their balls made; how many are still making clay balls?

Seven children are working in clay; three are making cubes, and the rest are making cylinders. How many are making cylinders?

It rained three days last week. How many days were pleasant?

Copy: Seven minus three are four.

Seven minus Four.

If it is seven miles to a certain lake, and I have travelled four miles, how much farther must I travel before I reach the lake?

If there are seven cows in a pasture, and four are driven out, how many will remain in the pasture?

If it takes seven yards of velvet to make my dress, and four yards to make yours, how many more does it require for my dress?

I have seven cents. If I spend four cents for a bunch of envelopes, how many cents will be left?

I gave seven little boys some number work to do; four have their work done. How many are still working?

If there were seven boys playing ball, and four left the game, how many were left to continue the game?

Show me on the board that seven dots minus four dots are three dots.

Show me that seven straight lines minus four straight lines are three straight lines.

Write : Seven minus four are three.

Exercise for Review.

Two pencils, three pencils, one pencil, and one pencil are how many pencils?

Three sheep, two sheep, and two sheep are how many sheep?

Four chickens and three chickens are how many chickens?

A figure of patch-work had two pieces on each of two sides, and one piece on each of the other two sides; how many pieces did the figure contain?

We have in our barn two old cats and five kittens; how many cats and kittens have we in all?

If there are three mugs on the table, and I put four more on the table, how many mugs will be on the table?

If only three of these mugs have milk in them, how many do not have milk in them?

If I have seven little fans, and give you four, how many fans shall I have left?

If I have seven letters to write, and I write three, how many more shall I have to write?

How many strokes does the clock strike between half-past twelve and half-past three?

I have a book which has as many leaves as there are days in the week less one; how many leaves has it?

How many pairs of skates and how many odd skates have you if you have seven skates?

How many pairs of gloves and how many odd gloves have you if you have seven gloves?

How many boots will there be in three pairs of boots and one odd boot?

If Jamie has seven yards of line to his kite, and John has two yards in one piece of his line, three in another piece, and one yard in each of two other pieces of his line, who has the longer line to his kite?

Which is more money, a five-cent piece and a two-cent piece; or, a three-cent piece, a two-cent piece, and two cents?

Which cost more, two books at three dollars each, and one book at one dollar; or, three books at two dollars each, and two books at a half-dollar each?

If it takes two yards and a half of cloth to make a jacket, how much cloth will it take for two jackets?

If a confectioner uses three ounces and a half of chocolate for one lot of taffy, how many ounces will he use for two such lots?

If two quarts of maple syrup will make three pounds of sugar, what will a quart of maple syrup make?

If two cakes of maple sugar weigh together a pound, what part of a pound will one cake weigh?

How many pounds will four cakes weigh?

How many pounds will six cakes weigh?

What will seven cakes weigh?

How many cakes that weigh a half a pound each will it take to equal three cakes that weigh a pound each?

If half a pint of syrup makes half a pound of sugar, what will four gills of syrup make?

If the cars pass our house every half-hour, how many times will they pass the house in three hours and a half?

Name two numbers which together make seven.

Name all the two numbers which together make seven.

Three and three and how many are seven?

Two and three and how many are seven?

One and three and how many are seven?

Three and how many are seven?

Four and how many are seven?

Two and how many are seven?

Seven minus two minus four are how many?

Seven minus three minus two are how many?

Seven minus two minus two are how many?

Seven minus one minus two are how many?

Seven minus two are how many?

Seven minus Seven.

Johnny had seven marbles, but on his way to school he lost seven of them; how many had he left?

There were seven eggs in a nest, but seven of them got broken; how many were there left in the nest?

Minnie had seven paper dolls, but gave seven of them to her little sister ; how many had she then ?

In the school-yard there are seven boys playing ball, and seven playing marbles ; how many more boys are playing ball than are playing marbles ?

Harry made seven snow men, but seven of them melted away ; how many were left ?

George had seven rabbits, but seven of them got away ; how many had he then ?

Fannie's uncle gave her seven pet doves, but seven of them were sick and died ; how many had she then ?

There were seven mice playing in the cellar ; the old cat caught seven of them ; how many mice were left playing in the cellar ?

In a doll-carriage seven dolls were riding, but seven of them were tipped out ; how many were left in the carriage ?

Seven robins were singing in a tree ; a boy threw a stone and frightened seven of them away ; how many robins were left singing in the tree ?

Copy : Seven minus seven is none.

Seven divided by One.

Take seven blocks. Show me one of your seven blocks. Show me another ; another ; another ; another ; another ; another.

How many one-blocks in your seven blocks ?

If there were seven oranges here, how many of us could have one apiece ?

Seven lamp-chimneys will supply how many lamps ?

Seven lamp-shades will supply how many lamps ?

Seven slates will supply how many children ?

I have seven hanging-pots of flowers ; if I hang one at a window, at how many windows can I hang them ?

I have seven brackets ; if I put each on a hook by itself, how many hooks will it take?

I have seven bottles to pack ; it takes a box for each bottle ; how many boxes must I have?

Write : There are seven ones in seven.

Seven Ones.

How many heads have seven boys?

How many hats will seven boys need?

If I read a book every day, how many books shall I read in a week?

If I read an hour each day, how many hours shall I read in a week?

If a bottle of ink lasts me a year, how many bottles shall I use in seven years?

If a family uses a barrel of flour a month, how many barrels will they use in seven months?

If I must wind my watch once a day, how many times must I wind it in a week?

If my watch loses a second a day, how many seconds will it lose in a week?

If you put a cent in the box every Sunday, how many cents will you put in in seven Sundays?

You may tell me a story about seven ones.

Write on the board : Seven ones are seven.

Seven divided by Seven.

How many yards of print, at seven cents a yard, can you buy for seven cents?

How many pounds of potatoes, at seven cents a pound, can you buy for seven cents?

How many bunches of violets, at seven cents a bunch, can you buy for seven cents?

How many roses, at seven cents a rose, can you buy for seven cents?

How many loaves of bread, at seven cents a loaf?

How many bottles of ink, at seven cents a bottle?

How many quires of paper, at seven cents a quire, can be bought for seven cents?

How many sponges, at seven cents a sponge?

Write: There is one seven in seven.

§ 22. COMPARISON OF SEVEN WITH NUMBERS KNOWN.

If you have seven apples, and I have six apples, how many more have you than I?

If a horse goes seven miles an hour, and a mule six miles an hour, how many more miles does the horse travel than the mule?

There are seven nuts in one of my hands, and six in the other; how many more in one than in the other?

If you have seven miles to ride, and I have six, how much farther have you than I to ride?

If Willie has seven words to copy, and George six, how many more words has Willie than George to copy?

John has seven rabbits, Cyrus has five; how many more rabbits has John than Cyrus?

One hen has seven chickens, another hen has five chickens; how many more has one hen than the other?

I can pick seven quarts of berries in the morning, Mary can pick five; how many more can I pick than Mary?

There are seven children on one settee, and five on another; how many more are there on one than on the other?

If you write seven stories in the morning, and five in the afternoon, how many more do you write in the morning than in the afternoon?

Seven books are on one shelf of the book-case, and four on another; how many more are on one than on the other?

There are seven boys and four girls in my second class; how many more boys than girls are there?

How many more strokes does the clock give for seven o'clock than for four o'clock?

One train leaves the station at four o'clock in the afternoon, the other at seven o'clock in the afternoon; how much later does the one leave than the other?

If half a pound of sago costs seven cents, and half a pound of rice four cents, how much more does the sago cost than the rice?

One boy earns seven cents a week, another boy earns three cents; how much more does one earn than the other?

It costs seven cents to send a package; how much more does it cost than to send an ordinary letter?

There were seven spools of thread in one box, and three in another; how many more spools were there in one than in the other?

If there are seven plants in one window, and three in another, how many more are there in one than in the other?

If there are seven empty chairs in one row of seats, and three in another row, how many more empty chairs are there in one row than in the other?

There are seven white clouds in the sky, and two gray ones; how many more white clouds are there than gray ones?

In one group of stars there are seven bright stars, in another group two bright stars; how many more are there in one than in the other?

If I wear out seven pairs of shoes in a year, and my brother wears out but two pairs, how many more pairs do I wear out than he?

Ellen is seven years old, Eddie is two years old; how much older is Ellen than Eddie?

If it takes seven yards of cloth to make me a dress, and two yards to make little Annie a dress, how much more does it take for me than for Annie?

If I have seven letters in one mail, and one letter in another mail, how many more letters do I get in one mail than in the other?

There are seven pencils on my desk; on Ned's desk there is one pencil; how many more pencils are there on my desk than on Ned's?

There are seven blossoms on my geranium, but only one on the wax-plant; how many more blossoms are there on the geranium than on the wax-plant?

It rained each day last week, but has rained only one day this week; how many more days did it rain last week than this week?

A whistle costs one cent, a toy balloon seven cents; how much more does the balloon cost?

Show me that seven is one more than six.

Show me that seven is two more than five.

Show me that seven is three more than four.

Show me that seven is four more than three.

Show me that seven is five more than two.

Show me that seven is six more than one.

If I have one cent, how much more must I earn to have seven cents?

If Harry has two doves, how many more must he get to have seven doves?

If I owe you seven cents, and have only three cents, how many more cents must I have in order to pay you?

On this stem there is a whorl of seven leaves, on this stem two pairs of leaves; how many more leaves in the whorl than in the two pairs?

You remain in school five hours in the day ; how many more hours would you remain at school to be there seven hours ?

I have six yards of ribbon ; I wish for seven yards ; how many more yards must I have ?

One and how many are seven ?

Two and how many are seven ?

Three and how many are seven ?

Four and how many are seven ?

Five and how many are seven ?

Seven and how many are seven ?

Seven minus what number equals six ?

Seven minus what number equals five ?

Seven minus what number equals four ?

Seven minus what number equals three ?

Seven minus what number equals two ?

Seven minus what number equals one ?

Four is three less than what number ?

Three is four less than what number ?

Two is five less than what number ?

Five is two less than what number ?

One is six less than what number ?

Six is one less than what number ?

Show me a row of seven dots on the board.

Put under them a row of six dots.

Put a row of five dots.

Make a row of four dots.

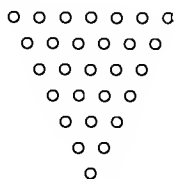
Make three dots in a row.

Make two dots.

Make one dot.

Tell the number of dots as I point.

(A triangle formed by making seven dots in a row, then six below them, etc., gives opportunity to compare seven with each smaller number, in different ways.)



Show me a number that is one less than seven; that is two less than seven. Show me a number that is three less than seven; that is four less than seven; that is six less than seven; that is five less than seven; that is no less than seven.

For seven cents how many one-cent stamps can I buy? How many two-cent stamps, and how many cents shall I have left? How many three-cent stamps, and what will remain?

How many four-cent pencils can I buy for seven cents, and how many cents shall I have left?

How many oranges, at five cents an orange, can be bought for seven cents, and how many cents will be left?

How many dozen buttons, at six cents a dozen, can you buy for seven cents, and how much money will you have left?

Exercise for Review.

Name four days of the week.

Name five months.

Name six holidays.

Give the names of seven children you know.

Give the names of six streets.

Give the names of five different birds.

Name four kinds of apples you have eaten.

What three strange animals did you see at the menagerie?

Name seven kinds of business by which men make a living.

Give the names of seven different kinds of trees.

What seven different flowers have you seen?

Name seven wild flowers.

Name seven cultivated flowers.

Tell me a story for what I show you.

Tell me now; and now.

Read what I show you ; again ; again ; and again.

Show me with the blocks what I tell you :

If I have seven hens, and sell five, I shall have two hens.

Mary has four dolls and Annie three dolls ; they have together seven dolls.

I can buy three apples, at two cents each, with seven cents, and have one cent left.

With six cents I can buy two three-cent stamps.

If a six-quart pail is half full, it has three quarts in it.

If a four-pint pail is half full, it has two pints in it.

If a pint of hulled corn costs three cents, a quart will cost six cents.

If one peach costs one cent, six peaches will cost six cents.

In three quarts there are six pints.

In one pint there are four gills.

If I owe you seven cents, and pay you in three pieces of money, I can give you a three-cent coin and two two-cent coins ; or, I can give you a five-cent coin and two cents ; or, I can give you two three-cent coins and one cent.

You may find what the pieces of money will be if I pay you seven cents with five pieces of money ; if I pay you with six pieces of money ; if I pay you with two pieces of money.

Draw a line an inch long for every day in the week but Saturday ; draw a line two inches long for Saturday. Measure to see if you drew each line the right length.

You may guess how long this envelope is ; how wide it is. How long this book is ; how wide it is. How long a side of this square is. How long a side of this triangle is. How thick this book is. How deep this box is. How high this spool is.

What two equal numbers make four ?

What two equal numbers make six ?

What two equal numbers make two ?

What two equal numbers and one make five?

What three equal numbers make six?

What three equal numbers make three?

What three equal numbers and one make seven?

See these stories I have written on the board:

Three and one are —.

Two and three are —.

Four and two are —.

Five and two are —.

Four and three are —.

Three and four are —.

Three twos are —.

Two twos are —.

Six minus four are —.

Five minus three are —.

Seven minus five are —.

Seven minus two are —.

Seven minus four are —.

Seven minus three are —.

There are two threes in —. There are three twos in —.

There are two twos and one in —.

There are three twos and one in —.

Who knows what word to put in place of the blank in the first story? in the second story? in the other stories?

(Let the blank in each case be filled with the proper word; the child writing the word.)

Illustrate what I tell you:

Of seven pocket knives which I saw, three only had blades open; how many had the blades shut?

Of seven apples which were on the table, five had no stem; how many had stems?

Five tops were spinning, but two have fallen over; how many tops are spinning?

Four cups are right side up on the table, and three are up side down; how many cups are on the table?

Four pears and two pears are how many pears?

CHAPTER VII.

THE NUMBER EIGHT.

§ 23. EIGHT AS A WHOLE.

Take seven blocks. Take one more block. Do you know how many blocks you have? You have *eight* blocks.

Show me eight chestnuts; eight spools; eight beans; eight buttons; eight fingers; eight books; eight pencils; eight marks on the blackboard; eight rounds on the settee; eight chair-legs; eight desk-stands; eight children at work; eight words on the blackboard.

Name eight things that you have seen at home; on the street.

Tell me eight things you have seen at the fair.

Tell me eight things you can do.

Arrange eight dots on the board in all the different ways you can.

Name eight letters you have learned to write.

Name eight words you can write, and take a block for each word.

Name eight numbers you know.

Name eight vegetables; eight animals; eight pieces of furniture; eight sounds you hear every day; eight different things you can see in the room.

Copy the word *eight* on your slate.

Take eight splints and arrange them all the ways you can. Copy the figures which you make with the splints.

§ 24. DISCOVERIES IN EIGHT.

Who can find two numbers that together make eight?

What two numbers make eight?

Name every two numbers which together make eight.

What numbers can you find in eight?

What will remain after taking each one of these numbers from eight?

What two equal numbers make eight?

What four equal numbers make eight?

What eight equal numbers make eight?

What one number makes eight?

How many fours can you find in eight? How many twos? How many ones? How many eights?

Show me one half of eight; two halves of eight.

What is one half of eight? two halves of eight?

§ 25. FACTS IN EIGHT.

Seven and One.

Each take seven blocks. Take one more block. How many blocks are seven blocks and one block?

Show me eight other objects in seven and one.

I can see on my chart seven stars, and one more star in the same row. Who sees what I see? How many stars do you see?

Tell me a story about this.

Tell me a story about seven cows and one cow.

Tell me a story about seven daisies and one daisy.

Tell me a story about seven butterflies and one butterfly.

Tell me a story about seven eagles and one eagle.

Tell me a story about seven buttercups and one buttercup.

If the week had one more day, how many days would there be in a week?

It took a week and one more day to cross the Atlantic Ocean; how many days did it take?

In two months there are seven weeks and one week; how many weeks in two months?

George is seven years old; how old will he be a year from now?

I have learned seven stanzas of a hymn, and there is one more stanza to learn; how many stanzas has the hymn?

There were seven wheels on a car, and one more wheel was ready to be put on; how many wheels would there be on the car when this one was put on?

Tell me stories about seven and one.

Write: Seven and one are eight.

One and Seven.

Show me one block. Show me seven more.

One block and seven blocks are how many blocks?

One spool and seven spools are how many spools?

One horse and seven horses are how many horses?

One man and seven men are how many men?

Tell me a story about one and seven; another; another; another; another.

In one corner of this card there is one dot, and in another corner seven dots; how many dots are there on the card?

If I have one stick of candy, and Jennie has seven, how many have both of us?

I paid one cent for a skein of linen thread, and seven cents for a spool of linen thread; how much did both cost?

I have one rooster and seven hens; how many fowls have I in all?

On Susie's eighth birthday she had a party, to which she invited seven children. How many children were there in all?

Write; One and seven are eight.

Eight minus One.

Show me eight blocks.

Do as I do. (Teacher puts one under the table.)

How many have you left?

How many did you take away?

Tell me about eight blocks minus one block.

Call your blocks rabbits, and tell me the same story.

Call them pigeons; call them chickens; call them geese swimming in the pond; call them ducks; call them snails; call them grasshoppers.

If there were eight wheels on a car, and one fell off, how many would be left on the car?

If there are eight persons in a car, and one gets out, how many remain in the car?

Write: Eight minus one are seven.

Eight minus Seven.

Take eight blocks; put back seven; how many have you left?

Take eight buttons; put back seven; how many have you left?

Make eight dots on the board; draw a line through seven; how many are left?

Draw eight straight lines on the board; erase seven; how many are left?

If there are eight ink-wells to fill, and I fill seven, how many remain to be filled?

If eight boys are on a sled, and seven fall off, how many boys are left on the sled?

Eight sheep are in a pasture. If seven get out, how many will be left in the pasture?

Eight potatoes grew in a hill ; seven were nice and large, the rest were small ; how many were small ?

Eight turkeys roosted in an open field ; seven on the fence, and the rest on the bars ; how many roosted on the bars ?

Tell me a story about eight minus seven.

Write on your slate : Eight minus seven is one.

One-Fourth.

You may cut this apple into halves. Cut each half into halves. Into how many pieces have you cut the apple ?

Cut this paper ring into halves. Cut each half into halves. Into how many parts have you divided the ring ?

Divide this circle in the same way. Into how many pieces have you cut the circle ?

Divide this star in the same way. Into how many pieces have you cut the star ?

Divide this square I have on the board into halves, by drawing a line from top to bottom. Divide each half into halves, by drawing a line from left to right. Into how many parts is the square divided ?

Divide this square into halves, by drawing a line from corner to corner. Connect the other two corners. Into how many parts have you divided the square ? Look at the parts, and tell me which is the largest part. Into what kind of parts, then, have you divided the square ?

Into what kind of parts did you divide the first square ? Into how many equal parts ?

Into what kind of parts is the star divided, and how many parts ?

How have you divided the circle ?

How have you divided the paper ring ?

How have you divided the apple ?

Show me one of the four equal parts into which the apple is divided. It is a *fourth* of the apple. Show me another of the four equal parts into which the apple is divided. It is a fourth of the apple. Show me another fourth of the apple; another fourth. Show me one of the four equal parts of the ring. What part of the ring is it? Show me each fourth of the ring. Each fourth of the star. Make a cross in one fourth of the square that is divided into triangles. Make a dot in another fourth. Make a straight line in another fourth. Make the letter *i* in the last fourth. Look at the square that is divided into squares. What part of the large square is each small square?

Divide this triangle into fourths, by drawing lines from the top to the base.

Divide this string into fourths.

Divide this sheet of paper into fourths.

Divide this strip of paper into fourths.

Divide this stick into fourths.

Mark off this line into fourths.

What have you seen cut into fourths?

Into how many pieces was it cut? Into what kind of pieces?

If I cut a pie into four equal pieces, what part of the whole pie is one piece? What part of the pie are two pieces? Four pieces will make what part of the pie? What part are three pieces?

If an orange is cut into four equal pieces, what part of the orange is each piece? What part of the orange are two pieces? are three pieces? are four pieces?

If a peach is divided into four equal pieces, what part of the peach is one piece? are two pieces? are three pieces? are four pieces?

If a pear is divided into four equal pieces, what part of the pear is each piece? are three pieces? are four pieces?

If you divide an apple into fourths, into how many parts do you divide it? Into what kind of parts? If you divide a stick into fourths, into how many parts do you divide it? Into what kind of parts? If you divide four blocks into fourths, into how many groups do you divide them? How many blocks are there in each group? Show me one fourth of four; two fourths of four; three fourths of four; four fourths of four. Divide eight blocks into fourths. Into how many groups have you divided them? Into what kind of groups? Show me one fourth of eight; two fourths of eight; three fourths of eight; four fourths of eight. What is one fourth of eight? What is one fourth of four? What are three fourths of four? two fourths of four? What is half of four?

Six and Two.

You may each take six blocks; take two more; how many blocks have you? Six blocks and two blocks are how many blocks?

Show me six straight lines on the board; show me two more straight lines; how many straight lines are there in all?

Show me six paper patterns; show me two more; how many are there in all?

Tell me a story for six and two; another; another.

I have six children on this side of the table, and two more on this side of the table. How many children are about the table?

If George writes the word **cup** six times, and then writes it two more times, how many times does he write it in all?

If there are six men on the car-platform, and two more jump on, how many are there on the platform?

Jamie found six eggs in one nest, and two in another; how many eggs did he find in both nests?

Write: Six and two are eight.

Two and Six.

Make two dots on the board ; make six more dots ; how many dots have you made ?

Draw two lines ; draw six more lines ; how many lines have you drawn ?

Find two paper knives ; find six more ; how many paper knives have you found ?

If I get two letters in the morning mail, and six in the evening, how many letters do I receive ?

If I have covered two books, and have six more to cover, how many books had I to cover at first ?

One cat has two kittens ; another has six kittens ; how many kittens have both cats ?

I have two pencils nicely sharpened, and six more to sharpen ; how many pencils have I ?

A post is two feet in the ground, and six feet out of the ground ; how many feet are there in the post ?

Write : Two and six are eight.

Eight minus Two.

A man had eight cows, but sold two ; how many did he then have ?

There were eight trees in a row, but two died ; how many lived ?

The price of a book was eight cents, but the bookseller took off two cents because the cover was marred ; how much was paid for the book ?

A little girl braids eight yards of matting each day ; when she has braided two yards, how many more yards has she to braid ?

John caught eight fish, but put two back in the water ; how many did he have to carry home ?

We have eight quarts of milk a day ; if we use two quarts at breakfast, how many quarts are left ?

Ellen picked eight quarts of blueberries, but spilled two quarts ; how many quarts did she then have ?

Addie can work eight inches of lace in a day ; when she has worked two inches, how many more inches can she work during the day ?

Write : Eight minus two are six.

Eight minus Six.

Eight little girls are weaving paper mats ; six mats will be finished to-day ; how many will be left unfinished ?

Eddie wrote eight words on his slate ; six were right ; how many were wrong ?

I have eight calls to make ; after I have made six calls. how many more calls have I to make ?

Eight children were playing store ; six thought they would set up a store by themselves ; how many were left to run the first store ?

Eight girls were playing "Drop the handkerchief" ; six were clapped out of the ring ; how many were left ?

Eight boys were playing "Fox and geese" ; six were geese ; how many were foxes ?

Eight boys were playing ball ; six took turns in throwing the ball, and the rest batted the ball ; how many batted the ball ?

Willie is going to have eight turrets to his block-castle ; he has built six ; how many more has he to build ?

I have a five-cent piece, a two-cent piece, and one cent. If I spend six cents, how many cents shall I have left ?

Tell me stories about eight minus six.

Write : Eight minus six are two.

Eight divided by Two.

Take eight blocks. Put your eight blocks into groups of two. How many two-blocks in eight blocks?

Find how many two-dots there are in eight dots.

Here are eight paper shoes; put them in pairs; how many pairs of shoes do you find in the eight shoes?

Here are eight skates; put them in pairs; how many pairs of skates do you find in eight skates?

Put these eight horses into spans of horses; how many spans of horses do you find in eight horses?

Put these mittens into pairs; how many pairs of mittens in eight mittens?

How many couples of buttons in eight buttons?

How many yokes of oxen in eight oxen?

How many pairs of ear-rings in eight ear-rings?

How many pairs of bracelets in eight bracelets?

How many brace of ducks in eight ducks?

A carriage-maker puts two wheels on each baby-carriage; how many carriages will eight wheels supply?

A family uses two pounds of butter a day; how many days will eight pounds last the family?

In eight pints how many quarts?

It requires two knobs for each drawer; on how many drawers will a cabinet-maker put eight knobs?

On how many trunks will a trunk-maker put eight handles?

If there are two pedals to each piano, eight pedals will supply how many pianos?

Eight cents will buy how many two-cent postage-stamps?

If I owe you eight cents, and pay you in two-cent coins, how many must I give you?

Tell me a story about eight divided by two.

Write: There are four twos in eight.

Four Twos.

Make two dots on the board; make below them two more dots; below these two other dots; and under all another two dots. How many two-dots have you made? how many dots?

Make lines on the board in the same way. How many two-lines have you drawn? how many lines?

Show me four two-blocks; how many blocks do you show me?

Show me four two-pitchers; how many pitchers have you shown me?

Show me four kinds of blocks, and two of a kind; how many blocks have you shown me?

Show me four kinds of buttons, two of a kind; how many buttons do you show me?

How many hands have four boys?

How many feet have four boys?

How many wings have four birds?

How many legs have four chickens?

How many rockers have four rocking-chairs?

How many leaves have four sheets of paper?

How many handles have four pairs of scissors?

How many legs have four pairs of compasses?

How many blades have four pairs of scissors?

How many cents will four two-cent books cost?

How many cents will four two-cent sticks of taffy cost?

Think of what you can buy for two cents, and tell me what four will cost.

Illustrate on the board the examples I give you, and tell me the answers:—

Ned has two doves; George has four times as many.

If there are two eggs in one nest, how many are there in four nests?

On a baby-carriage there are two wheels; on a car there are four times as many wheels.

Nellie has two dolls; Annie has four times as many dolls.

There are two plants in each of four windows.

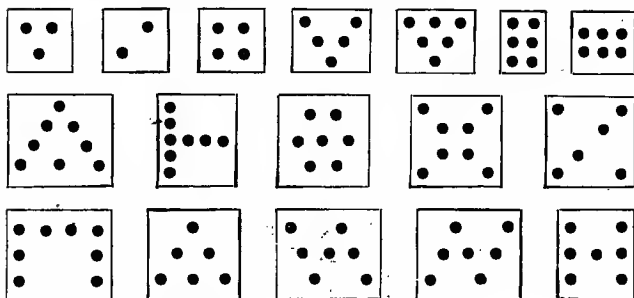
Four knives have each two blades.

Four desks have each two stands.

Write: Four twos are eight.

Exercise for Review.

Name the number of dots as I point.



Read as I erase dots.

Tell me a story for what I show you with the dots.

Write the right word in place of the blank, in these stories: —

Four and — are six.

Five and two are —.

Two and six are —.

Four and — are seven.

Three and four are —.

Seven minus — are five.

Seven minus — are three.

Eight minus six are —.

Two and — are four.

Four and two are —.

Six and two are —.

Five and — are seven.

Four and three are —.

Three and — are seven.

Seven minus two are —.

Seven minus four are —.

Eight minus two are —.

Two twos are —.

Three and — are six.

Three twos are —.

Two threes are —.

Two — are six.

There are two threes in —. Four twos are —.

There are four twos in —. There are three twos in —.

Divide this square into halves.

Divide it into fourths.

Divide this triangle into halves.

Divide it into fourths.

To divide this apple into halves, into how many pieces must I cut it? into what kind of pieces? and what part of the apple is each piece?

Show me one half of two; one half of four; one half of six; one half of eight.

I have cut this apple into halves; you may finish cutting it, so that it will be in fourths. In how many pieces is the apple divided? in what kind of pieces? and what part of the apple is each piece?

Mark off your slate into fourths.

Fold this handkerchief into fourths.

Mark off the board into fourths.

Show me what you think to be a fourth of your pencil; of your finger; of this table; of this line; of this book.

Show me one fourth of four blocks; one fourth of four crayons; one fourth of four pencils.

Divide eight blocks into fourths. Show me one fourth of eight blocks; two fourths of eight blocks; three fourths of eight blocks; four fourths of eight.

How many gills of water in a pint of water?

How many gills in one fourth of a pint of water? in two fourths of a pint? in half a pint?

If one gill of water weighs two ounces, what will a pint of water weigh?

If one gill of peanuts costs two cents, what will a pint of peanuts cost?

If one gill of milk will half fill a cup, how many gills will the cup hold? What part of a pint will the cup hold? How many cupfuls will make a pint?

My watch loses six seconds a day, and my brother's gains two seconds a day; if the watches are together in the morning, how much difference is there the next morning?

It is six miles to Boston; how many miles is it half-way to Boston?

If I walk two miles, and ride six miles, how many miles do I travel?

If I have eight cents, and buy a top for two cents, and a thimble for six cents, how many cents have I left?

If a boy earns two cents a day for Tuesday and Friday, and one cent for each of the other days in the week, how many cents will he earn during the week?

Alice bought a pencil for one cent, a book for one cent, six sheets of paper for one cent, a rubber for two cents, and a sponge for two cents, and had one cent left; how many cents did she have at first?

My wax-plant had two blossoms the first year, twice as many the second year, and the third year as many as it had the first and second years together; how many blossoms did it have the third year?

How many shells have four oysters? four clams? four snails?

If you divide an apple so as to give me three times as much as you have, how will you divide the apple? What part of the apple will you have? What part of the apple shall I have?

If you divide a pie into two pieces, so that one piece will be three times as large as the other, what part of the pie will each piece be?

If you divide an orange equally among four persons, what part of the orange do you give each person?

If you pour a pint of milk into four cups, each of the same size, how much will each cup hold? What part of a pint will each cup hold?

If you pour a quart of berries into four cups, each of the same size, how much will each cup hold? What part of a quart will each cup hold?

This line is four inches long. Show me what you think to be a fourth of the line. How long is a fourth of the line?

This line is eight inches long. Show me what you think to be a fourth of the line. How long is a fourth of the line?

Divide a square into four equal parts, by drawing a line from top to bottom, and a line from left to right; connect the corners, and tell me into how many parts you have divided the square.

We own a horse, two cows, a sheep, a dog, and two cats. How many animals do we own?

Ed has two white hens, two gray hens, two black hens, and enough speckled hens to make eight hens; how many speckled hens has he?

If two quarts of skim-milk cost me nothing, what will eight quarts of skim-milk cost me at the same rate?

If I have four cents, how many whistles at eight cents a whistle can I buy?

If I have six cents, how many whistles at eight cents a whistle can I buy? How many more cents must I have to buy one whistle?

One block, and three blocks, and three blocks, minus seven blocks, are how many blocks?

In looking over my gloves I found eight gloves; one was an odd glove; how many others were odd? How many pairs of gloves had I?

There are four hacks front of the station; each has two horses; how many horses are there front of the station?

Two persons can ride in a herdic; how many persons will four herdics carry?

Jack blacked eight boots before breakfast; how many pairs of boots did he black?

A fish has three fins on each side; how many fins has the fish?

Each fish has two gills; how many gills have three fishes?

One milking-stool has three legs; how many legs have two milking-stools?

In a dish are six apples; how many of us can take out two? how many of us can take three?

Count by twos to eight.

Count backward from eight by twos.

Five and Three.

Show me five fingers; show me three fingers; how many fingers do you show me?

See if five dots and three dots are eight dots.

Here is a picture of five chickens on the ground and three in the cherry-tree; how many chickens can you see?

Here are five rabbits eating clover, and three eating cabbage; how many rabbits can you see?

Harry has five doves and three kittens; how many pets has he?

If I give you a five-cent coin and a three-cent coin, how many cents do I give you?

How many cents must you pay for a five-cent stamp and a three-cent stamp?

What must I pay for a five-cent ticket and a three-cent ticket?

Tell me stories about five and three.

Write: Five and three are eight.

Three and Five.

There are three children on the settee; five more may sit with them; how many children are now on the settee?

Here is a card with three dots in one half and five in the other half; how many dots are on the card?

Here are three spools, which we will call soldiers; five more soldiers march up to them; how many soldiers are now standing here?

Three geese set up a cackle, and five more joined in; how many geese were then cackling?

One bracket has three cups, and another has five cups; how many plants will the two brackets hold?

If a farmer sleeps three hours before midnight, and five hours after midnight, how many hours does he sleep?

Tell me stories about three and five.

Write: Three and five are eight.

Eight minus Three.

Show me eight fingers; shut three fingers; how many fingers are open?

Show me eight blocks; put three under the table; how many blocks have you left?

Find eight stars; put three stars behind you; how many stars have you on the table?

Find eight birds; let three fly away; how many have you left?

Call these buttons eight frogs; three have now jumped into the pond; how many frogs remain?

Mary knit eight inches of edging, but the kitten got hold of the spool of thread and ravelled out three inches; how many inches of edging had she then?

In a chandelier of eight lamps, three were lighted; how many were not lighted?

There were eight tassels on my scrap-bag, but three have fallen off; how many are now on the scrap-bag?

Tell me stories about eight minus three.

Write: Eight minus three are five.

Eight minus Five.

Draw eight lines on the board, and cross five lines; how many lines are not crossed?

Make eight dots straight up and down on the board; draw a line through five; how many have no line drawn through them?

Make eight dots in a slanting line, and erase five; how many remain?

Make eight crosses on the board; cover up five; how many can you see?

Write eight i's; join five of them; how many are not joined?

I had eight pencils to sharpen; I have sharpened five; how many remain to be sharpened?

I have eight fans to paint; after I have painted five, how many will remain to be painted?

There are eight weeks in two months; if I have two months' vacation, and am busy five weeks, how many weeks have I to rest?

If I have two pints of milk, and use one pint and a gill, how many gills shall I then have?

Daisy has eight clover blossoms in her hand; five are red and the rest are white; how many are white?

Eight pansies minus five pansies are how many pansies? Tell me stories about eight minus five.

Write: Eight minus five are three.

Exercise for Review.

One robin, two swallows, three blue-birds, and two jays, are how many birds?

Two hens, three turkeys, and three ducks, are how many fowls?

Three horses, a dog, a sheep, and three cows, are how many animals?

Four roses and three lilies are how many flowers?

Five elms and three maples are how many trees?

Two rose-bushes, a lilac-bush, a syringa, and three flowering-almonds, are how many shrubs?

My watch is five seconds slow; if it loses three more seconds, how slow will it be?

I have three cents; how many more cents must I have to have eight cents? How many cents do I need to have seven cents?

A hen had eight chickens, but the cat caught two, and one got drowned; how many had she then?

I had a two-cent piece, one cent, and a five-cent piece; how many cents had I after spending five cents?

One week is what part of a month?

We have a new moon every month; how many new moons will there be in seven months?

We have a full moon every month; how many full moons will there be in eight months?

How many dozen buttons, at four cents a dozen, can I buy for seven cents? and how many cents shall I have left?

Two horses have how many feet?

Four cows have how many horns?

Four baskets have how many handles, if each basket has two handles?

In making a picture-book I put two pictures on a page; how many pictures can I put on two leaves?

What four equal numbers make eight?

What two equal numbers, and two more, make eight?

I have seven cards, and Annie has five; how many must I give Annie so that each of us may have the same number?

How many whole dollars are there in six half-dollars?

Four and Four.

You have four fingers on one hand, without your thumb, and four on the other; how many fingers have you without your thumbs?

Here are four cups and four saucers; how many dishes are there?

If Jennie wipes four knives and four forks, how many things does she wipe?

This card has four dots on one half, and four dots on the other half; how many dots has it?

On the table are four bottles and four glass stopples; how many things are on the table?

In the jeweller's window are four watches and four watch-cases; how many things are there in the window?

In the lower sash of the window are four panes of glass, and in the upper sash four panes; how many panes are in the window?

Show me that four splints and four splints are eight splints; that four spools and four spools are eight spools; that four cents and four cents are eight cents; that four *i*'s on one line, and four *i*'s on another line, are eight *i*'s; that four boxes and four box-covers are eight things.

It is four miles to the foot of Mt. Prospect; how many miles is it to the foot of Mt. Prospect and back?

Four little girls and four dolls made me a visit one day ;
how many made me a visit ?

Tell me stories about four and four.

Write: Four and four are eight.

Eight minus Four.

I have eight blocks ; I will put four back in the pile ;
how many blocks have I now ?

Nettie may take eight blocks, and give four to John ;
how many blocks has Nettie ?

Mary may find a card with eight dots on it ; cover four ;
how many dots can you see ?

Make eight dots ; erase four ; how many remain ?

Here are eight chickens in the yard ; four run to me for
some corn ; how many are in the yard now ?

The cook makes eight loaves of bread a day ; if we eat
two in the morning and two at noon, how many are left
for supper ?

There are eight wheels on a steam-car ; if four are taken
off, how many are on the car ?

There are eight desks in a row ; if four have no books in
them, how many have books ? If four children sit in the
row, there is room for how many more children ?

If I have eight yards of ribbon, and use four, how many
yards have I left ?

A wooden water-pail holds eight quarts ; if it has four
quarts in it, how many more quarts will it hold ?

I bought four quarts of berries this morning, but have
used four pints of the berries ; how many pints have I left ?

I have eight quarters of a dollar ; if I spend four quarters,
how many quarters have I to spend ? how many dollars ?

I had eight halves of a dollar ; I used four halves ; how
many halves have I now to use ? how many dollars ?

In a quart pail were eight gills of milk; we used four gills for breakfast; how many gills were left? how many pints? what part of a quart?

This strip of paper is eight inches long; if I cut off four inches, how long will it be?

Eight white clouds were floating in the sky a moment ago, but four have floated out of sight; how many can I see?

Write: Eight minus four are four.

Eight divided by Four.

Here are eight pencils; give four to as many children as you can.

Try it with eight buttons; to how many children can you give four buttons, if you have eight buttons?

Take eight cents; put four in a box; how many boxes does it take?

Take eight crayons, and put four at a board; at how many boards can you put four crayons, if you have eight?

A chair-maker has turned out eight chair-legs; how many chairs will they supply?

There are eight stove-legs on the floor in a tin-shop; how many stoves can the eight legs supply?

There are eight horses in the stable; how many four-horse coaches will the eight horses supply?

I have eight cents; how many four-cent sticks of twist can I buy?

A gardener had eight trees to set out; he put four in a row; how many rows did he set out?

There are eight gills of vinegar in a jug; how many pints of vinegar are in the jug?

Write: There are four twos in eight.

Two Fours.

Take four blocks; take another four blocks; how many four-blocks have you? how many blocks?

Here are four spools, and here are four spools; how many four-spools? how many spools?

Show me two boxes with four cents in each box; how many cents do you show me?

How many feet have two dogs?

How many paws have two kittens?

How many wheels have two four-wheeled carriages?

How many gills in two pints?

How many inches in two strips of card each four inches long?

How many fourths in two whole ones?

If you have four miles to ride, and I have twice as far, how far have I to ride?

If Lizzie must copy four words, and Victor twice as many words, how many words must Victor copy?

Tell me stories about two fours.

Write: Two fours are eight.

Exercise for Review.

If it takes six yards of carpeting for a hall that is three yards long, how wide is the hall?

Three quarts and a half of berries are how many pints of berries?

Three pounds and a half of potatoes, at two cents a pound, cost how much?

In two months how many weeks?

In two months how many moons?

Four cakes cost eight cents; what will two cakes cost?

How many bananas, at five cents each, can you buy for eight cents, and how many cents will you have toward buying another banana? How many bananas at the same price could you buy for seven cents, and how many cents would you have toward buying another?

How many strokes does the town clock give from half-past two to half-past four?

Letters are now carried for three cents; next year they will be carried for two cents; how much money will then be saved in sending six letters?

Four two-horse sleds have just passed; how many horses did it take to draw them? How many drivers, if there was a driver for each sled? If each driver had charge of two sleds, how many drivers would four sleds require?

How many runners had the four sleds?

How many stakes had each sled, if there were four stakes on a side? How many runners has a double-runner?

If a man lays two feet of wall in a day, how long will it take him to lay eight feet of wall? If two men lay four feet of wall in a day, how long will it take them to lay eight feet?

Name two equal numbers that make eight.

Name two equal numbers and two that make eight.

Name eight equal numbers that make eight.

A little iron rake had eight teeth, but four got broken out; how many did the rake then have?

How many handles have four plows?

A pitchfork has four tines; how many tines have two such pitchforks?

A man could get only a half cord of wood each time; how many times would he need to go to get four cords?

How many shafts have three wagons?

An ox has two toes on each foot; how many toes has he altogether?

An ox wears two shoes on each foot; how many shoes does he wear?

A blacksmith has eight horseshoes; how many horses can he shoe all round?

There are two heads to a barrel; how many heads have four barrels, if one barrel-head is gone?

Eight minus Eight.

There are eight children about the table; eight children may sit on the platform; how many children are now about the table?

Here are eight spoons; you may put eight spoons in the box; how many spoons remain out of the box?

There are eight buttons on your boot; if eight buttons come off of your boot, how many will there be on the boot?

There are eight buttons on your jacket; if mamma cuts off eight buttons, how many buttons will there be on your jacket?

Johnnie filled eight baskets with leaves, but Albert tipped over eight baskets and scattered the leaves; how many were then filled with leaves?

Willie's uncle gave him eight dollars; Willie put eight dollars in the bank; how many dollars had he beside?

In a show-window there were eight doll-cradles, but eight of them were sold; how many were left to sell?

There are eight things in my pencil-tray; if I take eight things out of the tray, how many things remain in the tray?

Eddie had eight cookies; when he had eaten eight cookies, how many cookies had he to eat?

Tell me stories about eight minus eight.

Write: Eight minus eight are none.

Eight divided by One.

Take eight cups; put each in a saucer; how many saucers does it take for the eight cups?

Take eight spoons; put each in a cup; how many cups does it take for the eight spoons?

Take eight pencils; give one to each of as many children as you can; to how many children can you give one pencil each, if you have eight pencils?

To how many children can the salesman sell eight slates, if he sells one to each child?

Eight hooks will be enough for how many pictures, if one hook is enough for one picture?

Eight cents will buy how many one-cent books? how many one-cent stamps? how many one-cent pencils?

Eight horses will take how many stalls, if one horse takes one stall?

Tell me stories about eight divided by one.

Write: There are eight ones in eight.

Eight Ones.

How many handles have eight knives?

How many seats have eight chairs?

How many tops have eight tables?

How many trunks have eight elephants?

Eight birds have how many bills?

Eight windows have how many shades?

Eight rooms have how many ceilings?

Eight mirrors have how many frames?

Eight men were going into the woods to work; the farmer's wife put up a lunch for each; how many lunches did she put up?

How many stamps will be required for eight letters, if each letter requires one stamp?

How many times does the girl go to the market, if she goes once a day for eight days?

If we eat a pound of oatmeal each day, how many pounds shall we eat in eight days?

Tell me stories for eight ones.

Write: Eight ones are eight.

Eight divided by Eight.

How many ones can you find in eight?

How many twos can you find in eight?

How many fours can you find in eight?

How many eights can you find in eight?

If you had eight fish-hooks, to how many boys could you sell a fish-hook?

How many eight-cent watches can you buy for eight cents?

A gardener setting out trees, sets eight in a row; how many rows can he make from eight trees?

A large oven will hold eight pies; how many times must the cook bake to bake eight pies?

How many eight-cent loaves of bread can you buy for eight cents?

If crackers are eight cents a dozen, how many dozen crackers can be bought for eight cents?

Tell me stories for eight divided by eight.

Write: There is one eight in eight.

Halves of Eight.

Take eight blocks; divide them into halves.

Show me one-half of eight blocks; how many blocks are one-half of eight blocks?

Find one-half of eight baskets; how many baskets are one-half of eight baskets?

Show me one-half of eight buttons; how many buttons are a half of eight buttons?

How many cards are one-half of eight cards?

How many newspapers are one-half of eight newspapers?

How many apples are one-half of eight apples?

I have eight kittens; if I give away half of them, how many kittens shall I give away?

I spent four cents this morning, which is half the money I had; how much money had I?

Johnnie, who is four years old, is half as old as George; how old is George?

There are eight gills in a quart; how many gills in half a quart?

Rice is eight cents a pound; what will half a pound of rice cost?

Four miles is half the distance home; what is the distance home?

When four of the lamps in a chandelier are lighted, half of the lamps are lighted; how many lamps has the chandelier?

Four is one-half what number?

Eight is twice what number?

Show me two halves of eight blocks.

Which had you rather have, eight oranges or two halves of eight oranges?

Which is the more jelly, eight cups of jelly or two halves of eight cups of jelly?

A man who had eight horses, sold half his horses; how many horses did he sell?

When the hour-hand is one-half the distance from twelve to eight, to what figure does it point?

I had eight letters to write; I have written four; what part of eight have I written?

Write: One-half of eight is four.

Fourths of Eight.

Put eight blocks into four equal groups. How many in each group?

What part of eight is each group?

How many blocks in a fourth of eight blocks? Show me a fourth of eight buttons; how many buttons do you show me?

Arrange eight children in rows so that a fourth of them will be in each row.

Put eight books in piles so that a fourth of them will be in each pile.

Arrange eight dots in rows so that a fourth of eight dots will be in each row.

Put eight shells in boxes so that a fourth of them will be in each box; how many shells in each box?

I divided eight picture-books equally among four children; how many books did I give to each child? what part of eight did I give to each?

A boy who earned eight dollars a week, saved a fourth of it each week; how much did he save?

A little girl who had eight cents, spent a fourth of her money for a pencil; how much did the pencil cost?

Irene had eight weeks' vacation; she spent a fourth of her vacation at the beach; how many weeks did she stay at the beach?

How many weeks in a fourth of two months?

How many gills in a fourth of a quart?

I cut an apple into eight pieces; if I gave Alice two pieces, what part of the whole number of pieces did I give her?

There were eight roses on a bush; two fell off; what part of the whole number of roses fell off?

Eight boys were drilling in a military company; two were ordered out of the line for not paying attention; what part of the whole number was ordered out?

It is eight miles to a certain lake; if I walk two miles, what part of the distance do I walk?

A tin-peddler travels eight miles a day; what part of the distance has he gone when he has travelled two miles?

In a figure which Willie designed with splints, there were eight triangles; how many triangles were there in a fourth of the design?

Tell me what part of eight dots I make on the board. Tell me what part of eight cents I show you. Tell me what part of eight nuts I put in the drawer; how many nuts?

A boy earned eight dollars in four weeks; how many dollars did he earn a week?

Annie can write eight stories in four minutes; how many stories does she write a minute?

Four pairs of boots cost eight dollars; how many dollars a pair do they cost?

Four erasers cost eight cents; what does one eraser cost?

Four pairs of silk mittens cost eight dollars; what is the price of a pair?

What is one-fourth of eight?

Two is one-fourth of what number?

One-fourth of eight is how many?

Show me two-fourths of eight splints.

How many splints are two-fourths of eight splints?

Show me three-fourths of eight splints.

How many splints are three-fourths of eight splints?

Show me four-fourths of eight splints.

Which is more, eight splints or four-fourths of eight splints?

If the cook uses one-fourth of eight eggs each day, how many fourths of eight eggs will she use in four days? how many eggs?

If each person eats one-fourth of eight eggs for breakfast, how many eggs do four persons eat?

Eight minus one-fourth of eight are how many?

Eight minus two-fourths of eight are how many?

Eight minus one-half of eight are how many?

Write: One-fourth of eight is two.

§ 26. COMPARISON OF EIGHT WITH NUMBERS KNOWN.

At Roy's house are eight kittens and eight puppies; how many more kittens are there than puppies?

At the Zoölogical Gardens there were eight bears and eight seals; how many more bears than seals were there?

Find how many more there are in eight than in seven.

If there were eight boats going down the river, and seven going up the river, how many more boats were going down the river?

If there were eight honey-bees, and only seven honey-suckle blossoms, would there be a blossom for each bee? how many bees would have to fly to another flower?

Harry has eight figs, Louise seven figs; how many more figs has Harry than Louise?

Find how many more there are in eight than in six.

How many more legs have two oxen than three boys?

How many more legs have two chairs than two three-legged stools?

I have four two-cent coins; Mary has two three-cent coins; how much more money have I than Mary?

Four two-horse sleds will require how many more horses than six single-horse sleds?

Eight boys are raking hay; six men are mowing; how many more boys than men are there in the hay-field?

Find how many more there are in eight than in five.

I have eight daisies and five violets; how many more daisies than violets have I?

Eight boys were playing polo; five were looking on; how many more were playing than looking on?

There were eight mice in a basket, and five kittens all ready to eat them; how many more mice than kittens were there?

I have two three-cent pieces and two cents in my purse, and a five-cent piece in my hand; how much more have I in my purse than in my hand?

Find how many more there are in eight than in four.

How many more wheels has a steam-car than a carriage?

Two chairs have how many more legs than one chair?

Eight horses have how many more heads than four horses?

Two squares have how many more sides than one square?

Find how many more there are in eight than in three.

This room is eight feet high; this little girl is only three feet high; how much higher is the room than Blanche?

A cat, a rooster, and a donkey agreed to travel together; they overtook eight robbers; how many more were in one company than in the other?

I skated three times across the pond; Florence skated eight times across the pond; how many more times did Florence skate across the pond than I?

Two men were selling balloons; one had sold all but eight; the other had sold all but three; how many more had one to sell than the other?

Find how many more there are in eight than in two.

One dog had eight bones thrown out to him; another had only two bones; how many more bones did one have than the other?

How many more gills are there in a quart than in a tea-cup, if the tea-cup holds two gills?

How many more shoes does an ox wear than you ?

Find how many more there are in eight than in one.

A cabinet-maker made eight tables with drawers, and one without ; how many more did he make with drawers than without ?

There are two card-baskets on the table ; one has eight cards in it, the other has only one card ; how many more cards has one basket than the other ?

In one fruit-dish there are eight clusters of grapes ; in another one cluster ; how many more clusters are there in one dish than in the other ?

Eight is how many more than one ?

One is how many less than eight ?

Eight is how many more than seven ?

Seven is how many less than eight ?

Eight is how many more than two ?

Two is how many less than eight ?

Eight is how many more than six ?

Six is how many less than eight ?

Eight is how many more than three ?

Three is how many less than eight ?

Eight is how many more than five ?

Five is how many less than eight ?

Eight is how many more than four ?

Four is how many less than eight ?

Charley has eight rabbits ; Bennie has half as many ; how many more rabbits has Charley than Bennie ?

In one hand I have four two-cent pieces ; in the other hand I have only half as many two-cent pieces ; how many more cents are there in one hand than in the other ?

There were eight of us when we were children at home ; there were half as many cousins in the house opposite ; how many more of us were there than cousins in the house opposite ?.

This line is eight inches long; this short line is only one-fourth as long; how much longer is one line than the other?

Eight children are playing "Ring around Rosy"; one-fourth of that number are playing ball; how many more are playing in the ring?

One and how many are eight?

Seven and how many are eight?

Two and how many are eight?

Six and how many are eight?

Three and how many are eight?

Five and how many are eight?

Four and how many are eight?

Eight and how many are eight?

Eight minus one are how many?

Eight minus seven are how many?

Eight minus two are how many?

Eight minus six are how many?

Eight minus three are how many?

Eight minus five are how many?

Eight minus four are how many?

How many fours in eight?

How many twos in eight?

How many ones in eight?

One-half of eight is how many?

One-fourth of eight is how many?

One-eighth of eight is how many?

Four blocks are what part of eight blocks?

Two blocks are what part of eight blocks?

One is what part of eight?

CHAPTER VIII.

THE NUMBER NINE.

§ 27. NINE AS A WHOLE.

Take eight blocks ; put one more block with them. Show me just as many paper disks ; as many splints ; as many shells ; as many pebbles ; as many paper patterns ; as many dots on the board ; as many lines on the board ; as many *i*'s on the board. You have shown me *nine i*'s. How many lines have you shown me ? how many dots ? how many splints ? how many blocks ? Find nine bits of crayon. Mary, collect nine pencils from the desks. Harry, pick out nine cents. Annie, put nine cups in a row. Georgie, find nine saucers to go with these cups. Alice, find a card with nine dots on it. Fannie, pick out nine paper spoons.

Who thinks there are as many as nine desks in two rows of desks ? that there are as many as nine rounds on the back of the settee ? that there are as many as nine figures on the clock ?

Mention the things in this room of which there are at least nine.

Name nine different things you see in this room. Name again.

Arrange nine dots on the board in all the ways you can.

Mention things of which you would see nine on the street ; in your homes.

Name nine different things you saw on your way to school this morning, and take a block for each one.

Each take nine splints; see how many designs can be made using the nine splints each time.

§ 28. DISCOVERIES IN NINE.

Take nine blocks. Each show me two numbers that together make nine. Tell me what you have found. Find again; tell me what you have found.

Each take a number out of nine. Tell me what you have taken away, and what remains. Try it again, and tell me what you have.

Separate nine into equal groups, and tell me what you have.

See if you can separate nine into halves; into fourths.

Find what you must put with eight to make nine; with seven; with six; with five; with four; with three; with two; with one; with none.

What number taken from nine will leave one? will leave two? will leave three? four? five? six? seven? eight?

Copy the word **nine** on your slates.

§ 29. FACTS IN NINE.

Eight and One.

Illustrate the story I tell you with blocks. Eight chickens were eating out of a dish, and one more chicken came to eat with them; how many chickens were then eating out of the dish?

Illustrate again. There were eight little mice in a nest, and the mother mouse; how many were there in all?

There were eight swallows' nests in a sand-bank, and one more nest was built. How many nests were then in the sand-bank?

Eight children were playing tag, and one more child joined them; how many were then playing tag?

Eight morning-glories were blossomed early this morning, and one more morning-glory blossomed out before I came to school; how many blossoms were then on the vine?

I paid eight cents for a book, and one cent for a pencil; how much did I pay for both?

There were eight pictures in my scrap-book, and I have just put one more picture in it; how many pictures are now in my scrap-book?

I have eight pictures in my room; how many shall I have if I buy one picture more?

Eddie has eight story books; how many will he have if another story book is given him?

You have been to school eight months this year; if you go another month, how many months will you have been to school?

Tell me a story about eight quarts of blackberries and one quart of blackberries; eight currant bushes and one currant bush; eight pounds of butter and one pound of butter; eight pans of milk and one pan of milk; eight rows of trees and one row of trees; eight robins and one bluebird; eight roses and one tulip; eight cows and one horse; eight hand-rakes and one horse-rake.

Write: Eight and one are nine.

One and Eight.

Show me one block; show me eight blocks more; how many blocks have you shown me?

Tell me a story for what you have shown me.

One sunbeam played through a hole in the roof of the barn, and soon eight more sunbeams came too; how many sunbeams then lighted the barn?

At one place under the eaves was a swallow's nest, and at another place there were eight nests; how many nests were there in all?

Willie found one egg in one nest, and eight eggs in another nest; how many eggs did he find?

If, in the end of a house there is one window under the eaves, and eight more windows below it, how many windows in all?

I have one nut in my hand; if you give me eight nuts more, how many nuts shall I have?

The cook, in making an apple pudding, put one apple in the middle of the dish, and eight apples around it; how many apples did she put in the dish?

One little boy wished to play with the blocks, and then eight more boys wanted to play with them; how many boys wanted to play with the blocks?

Harry's mother told him he might go nutting if he could get any boys to go with him. He found eight boys who could go; how many boys were there in all to go nutting?

One sheep jumped over the fence, and so eight more sheep jumped over the fence; how many sheep jumped over the fence?

Write: One and eight are nine.

Nine minus One.

Stand nine spools in a row. Call them soldiers. One soldier got out of line; how many soldiers were left in line?

Call them lamp-posts. One lamp-post had no lamp on it; how many lamp-posts had lamps?

Call them ninepins. One ninepin tumbled over; how many ninepins were left standing?

Call them chimneys a mason had to build. He built one chimney; how many more chimneys had he to build?

Call them lamp-chimneys. One lamp-chimney got broken; how many lamp-chimneys were left?

Call them gate-posts. One gate-post fell over; how many gate-posts remained standing?

Call them pencils I must sharpen. If I sharpen one pencil, how many more pencils remain to be sharpened?

Call them pumps which a pump-maker had to sell. He sold one pump; how many pumps had he left?

Call them weather-vanes. One weather-vane blew over; how many weather-vanes were there then?

Nine minus Eight.

Make nine dots on the board. Draw a line through eight of them; how many more dots are there?

Draw nine straight up-and-down lines. Erase eight; how many are left?

Draw nine right-and-left lines. Cover eight of the lines with your hand; how many lines do you see now?

Show me nine blocks minus eight blocks.

There were nine apples in the fruit-dish this morning, but eight have been eaten; how many are left?

Nine doves were in the walk picking up crumbs. When I opened the door, eight of them flew away; how many were then in the walk?

A hen had nine chickens, but they went into the wet grass and eight died; how many chickens were there then?

There were nine hacks at the station. Eight of them had passengers; how many had none?

There were nine pigs in the pen, eight got out of the pen, how many remained in the pen?

I have nine books to cover. When I have covered eight, how many more will there be to cover?

If there are nine pins on the cushion, and I use eight, how many will there be on the cushion?

Who will tell me a story for nine minus eight? Another story? another? another?

Write: Nine minus eight is one.

Exercise for Review.

Show me four blocks; six blocks; five blocks; seven blocks; nine blocks; eight blocks.

Tell the number I show you. Again; again.

Find how many twos in four. Give me a story for four divided by two.

Find how many twos in six. Give me a story for six divided by two.

Find how many twos in eight. Give me a story for eight divided by two.

Show me eight, in twos. How many twos?

Tell me a story for four twos are eight.

Show me six, in twos. How many twos?

Give me a story for three twos are six.

Show me six, in threes. How many threes?

Give me a story for two threes are six.

Harry had six arrows for his bow, but has shot two; how many has he left? If he had shot four, how many would have remained?

If he has four arrows, and makes two more, how many arrows will he have?

If he loses all but two of these arrows, how many will he lose? If then he buys four more, how many will he have?

Six pencils minus four pencils are how many pencils?

Six pencils minus two pencils are how many pencils?

Four pencils and two pencils are how many pencils?

Two pencils and four pencils are how many pencils?

Write on the board: Six minus four are two.

Write: Six minus two are four.

Write: Four and two are six.

Write: Two and four are six.

If John has for a team of horses, the kitten, a cloth elephant, two wooden horses, and a pair of boots, how many horses has he?

If there are two kittens on the table, one kitten in a chair, and three kittens on the floor, how many kittens are there in all?

There were seven little boys dressed as soldiers; two had flags; how many did not have flags?

Jamie had seven rabbits, but gave two away; how many had he then?

Nellie's writing-book cost seven cents. She had only five cents; how many more cents did she need to pay for it?

If she had only two cents, how many more cents would she need?

A five-cent piece and a two-cent piece are how many cents?

Write on the board: Five and two are seven.

Write: Two and five are seven.

Write: Seven minus two are five.

Write: Seven minus five are two.

There were four ducks in the pond, and three on the edge of the pond; how many were there in all?

There were three mice in the pantry, and four more came to join the fun; how many mice were then in the pantry?

My lamp will burn seven hours. After it has burned three hours, how many more hours will it burn?

After it has burned four hours, how long will it burn?

There were seven yachts in the harbor; three were moored; how many were sailing about?

There were seven roses on my rose-bush, but I cut off four this morning; how many were left on the bush?

Four and how many are seven?

Three and how many are seven?

Seven minus three are how many?

Seven minus four are how many?

Show me one-half of four. One-half of six. One-half of eight.

Show me one-fourth of four. One-fourth of eight.

It is four miles from Boston to Mount Auburn; how far is it half-way to Mount Auburn?

I teach six hours a day; how many hours do I teach in half a day?

If I cut a pie into eight equal pieces, how many pieces will there be in half the pie?

If I cut an apple into four equal pieces, what part of the apple is each piece?

If I have four apples, and give you one-fourth of the number I have, how many apples shall I give you?

If I give you two-fourths, how many shall I give you? If I give you three-fourths? If I give you four-fourths?

I had eight cents in my pocket, but I spent a fourth of my money; how much money have I left?

Ed had eight hens, but sold a fourth of the number he had; how many had he left?

Etta found eight eggs, but she broke a fourth of them; she then found half as many more as she had left; how many had she then?

I had eight blossoms on my geranium, but a fourth of them fell to pieces, and I cut off half of what remained; how many blossoms were left on the plant?

Alfred had four nuts, and gave me two-fourths of what he had; how many nuts did he give me?

James had four apples, and gave his brother two-fourths of what he had; how many apples did he give his brother?

Charley had four fish-hooks, and traded away two-fourths of them; how many did he trade away?

Fred caught four fish, but three-fourths of them were too small to eat, so he put them back in the water; how many did he put back?

A fisherman had four boats; three-fourths of the number he had leaked; how many leaked?

In a class there were eight children; one-fourth of the number was absent; how many fourths were at school?

If two-fourths had been absent, how many children would have been absent?

If three-fourths of the children were at school, how many were at school?

If you have five buttons on your boot, and mamma sews three more on your boot, how many buttons will there be on your boot?

If there are five little girls on one side of the table, and three boys on the opposite side of the table, how many children are there about the table?

Mary had four two-cents pieces, and spent three cents; how many cents had she left?

If she had spent five cents, how many cents would she have had remaining?

In the barn are four spans of horses. If a span of horses and a single horse are taken out of the barn, how many horses will remain in the barn?

If two spans and a single horse are taken out, how many horses will be left in the barn?

I have enough berries to fill four two-quart measures. If I sell three quarts, how many quarts shall I have left?

If I sell five quarts, how many quarts shall I have left?

Two chairs were stored away in the attic; one chair had lost two legs, and the other chair one leg; how many legs did both chairs have together?

If one chair had lost three legs, and the other chair two legs, how many legs would the two chairs have?

Three oranges and how many oranges are eight oranges?

Five oranges and how many oranges are eight oranges?

Eight oranges minus how many oranges are five oranges?

Eight oranges minus how many oranges are three oranges?

Draw a line an inch long on the board. Measure off on the edge of the table what you think to be an inch.

Divide this strip of paper into inches.

Mark off this line into inches.

Tell me how long you think the side of this square is; the side of this triangle; the longer side of this oblong; the shorter side of the oblong.

Divide this figure on the board into inch squares.

How many inches high is this gill measure? How many inches across the bottom?

How many times must you fill the gill measure to dip out a pint of water?

If it takes a gill of molasses for one pot of baked beans, how many pints of molasses will be required for four pots of baked beans?

If it takes a pint of milk for a custard, how many gills of milk does it take?

If it takes a pint of berries for a pudding, how many times must Harry fill his gill cup to have enough berries for the pudding?

A pint of ice cream will furnish how many persons a gill each?

We have two pints of milk every morning. How many gills do we have? How many quarts of milk do we have?

A coffee-cup holds two gills; how many cupfulls will it take to fill a pint measure? How many will it take to fill two pint measures? How many will it take to fill a quart measure?

I picked eight pints of cranberries; how many quarts of cranberries did I pick?

There are eight pints of cream in the cream-pail; how many quarts of cream are in the pail?

Large milk-cans hold eight quarts of milk. If the milk-can is half full, how many quarts are in the can? How many pints?

If I had eight pans of milk to skim, and I have skimmed half of them, how many have I skimmed?

The snow is two feet deep now, which is half as deep as it has been; how deep has it been?

There are four links in half an inch of my watch-chain; how many links are there in an inch of my watch-chain?

There are eight apples in the fruit-dish; to how many boys can I give two apples apiece?

Seven and Two.

Here are seven dolls. Put two more dolls with them; how many dolls are there now?

You may tell me about seven blocks and two blocks; seven dots on one half of the card and two on the other half; seven splints and two splints; seven straight lines and two curved lines; seven horses and a span of horses; seven butterflies and two butterflies; seven girls and two boys; seven chimneys and two chimneys; seven robins and two bobolinks; seven cows and a pair of oxen.

Fannie found seven ripe strawberries in the morning, and two in the afternoon; how many ripe strawberries did she find in all?

Near a thistle are seven yellow butterflies. If two more yellow butterflies come, how many yellow butterflies will there be?

Seven loads of hay passed my house yesterday and two to-day. How many loads of hay passed yesterday, and to-day?

There was a shower every day last week, and there have been two showers this week. How many showers have we had within two weeks?

I stayed a week and two days at the beach last summer. How many days did I stay at the beach?

I can see from my window two beech-trees, five maple-trees, and two elms. How many trees can I see?

There are four ducks in the pond, three on the bank, and two more coming. How many ducks are there in all?

I have two nuts, Mary has twice as many and one more, and Jennie has two. How many nuts have we together?

If Frank has one cent, Harry six times as many cents, and Ellen two cents, how many cents have the three together?

If John has five cents and spends three cents, then earns five cents, and I give him two cents, how many cents will he have?

Write: Seven and two are nine.

Two and Seven.

Take nine blocks. Separate them as I do mine. How many here? (Two.) How many here? (Seven.) Show me two of your blocks. Show me seven of your blocks. How many blocks are your two blocks and your seven blocks?

Here are two lines on the board; draw enough more to make nine lines. How many did you draw?

Here are two dots. Make enough more dots to have nine dots. How many did you make?

In a basket of fruit were two pears and seven apples. How many pears and apples were there together?

The tickets to a concert are a half-dollar each. If I take two tickets, and the rest of the family take seven tickets, how many half-dollars do we pay for tickets to the concert? How many dollars?

I have two quarters of a dollar in my purse and enough change to make seven quarters more. How much money have I in my purse?

One side of this right angle is two inches long, and the other side is seven inches long. How long are both sides of the angle?

Two honey-bees were on a morning-glory, and seven others were flying near. How many honey-bees were there in all?

There are two black spools on this string, and seven white spools. How many spools are on the string?

Edward has two cents. Mary has three times as many cents and one cent beside. How many cents have they together?

Charlie has a two-cent piece of money. I have two three-cent pieces of money and one cent beside. How much money have we together?

You may tell me a story about two and seven.

Write: Two and seven are nine.

Nine minus Two.

I have nine dots on the board; I will cover two. How many can you see now?

Here are nine tin plates; I will bake pies on two of the plates. How many plates will be left in the pile?

Here are nine paper wheels; play they are water-wheels and that you have set two of them in the brook. How many will you have left?

Pick out nine birds from the box of patterns; play two flew away. How many are left?

Find nine horses. Hitch a span to a cart. How many horses have you beside the span?

Nine tops were spinning at the same time. Two tumbled over. How many were then spinning?

There were nine chickens in a brood. Two were white and the rest were brown. How many were brown?

There were nine panes of glass in the lower sash of a window. One pane was broken and another cracked. How many were whole?

I had nine postal cards this morning, but I have used two. How many have I left?

Nine boys were playing ball, but two left the game. How many remained playing.

There were nine things in my pencil tray; I took out a pencil and an eraser. How many things remained in the tray?

Each think of a story for nine minus two. Who has a story ready? Tell me your story.

Write: Nine minus two are seven.

Nine minus Seven.

Show me nine cubical blocks; put back seven. How many remain?

Show me nine rectangular blocks; put back seven. How many remain?

Show me nine lines on the board; erase seven. How many lines remain?

Here are nine soldier caps. Seven soldiers have taken their caps. How many caps are left?

There are nine cars on a passenger train; one car was a smoking car, two cars were sleepers, and four cars were ordinary passenger cars; the rest were baggage cars. How many were baggage cars?

There were nine books on a shelf; four had red backs, three had green backs, and the rest were brown. How many were brown?

Nine bottles stood on a shelf; two had glycerine in them, five had medicine, and the rest were empty. How many were empty?

There are nine more days in this month; how many days will there be after a week has passed?

A boy had nine cents; he spent two cents each day for three days and one cent the next day. How many cents had he then?

If he had spent three cents each day for two days and one cent beside, how many cents would have remained?

If he had spent two cents each day for two days and three the next day, how many cents would have remained?

If he had spent a cent each day for five days and two beside, how many cents would have remained?

Tell me about nine minus seven.

Write: Nine minus seven are two.

Exercise for Review.

Five and two and how many are nine?

Four and three and how many are nine?

One and six and how many are nine?

Four and four and how many are nine?

Five and three and how many are nine?

Two and six and how many are nine?

One and three and two and two and how many are nine?

Two and three and two and how many are nine?

There were nine apples in a dish; two were sweet and the rest were sour. How many were sour?

Charlie had nine pencils; three were too short to use, and four were not sharpened; how many were ready for use?

Nine minus what number is eight?

Nine minus what number is seven?

Nine minus what number is one?

Nine minus what number is two?

Tell me two numbers you may take from nine and have two remain.

What two equal numbers make eight?

What two equal numbers make six?

What two equal numbers make four?

What two numbers, one of which is one more than the other, make five?

What two numbers, one of which is one more than the other, make three?

What two numbers, one of which is one more than the other, make seven?

What two numbers, one of which is two more than the other, make eight?

How many pairs of gloves have I if I have eight single gloves?

I have two cents; James has twice as many. How much money have we together?

Nellie has two dolls; Ida has four times as many. How many more dolls has Ida than Nellie?

Old Dolly can travel two miles in half an hour; the colt can travel twice as fast. How far will the colt travel in an hour?

Apples are selling, two for a cent, but if you buy a single apple you must pay a cent. How much will nine apples cost?

Lemons are selling, two for three cents. How many lemons can you buy for six cents?

If an orange were divided equally between two boys, what part of the orange would each boy have?

If two oranges were divided equally between two boys, what part of the two oranges would each boy have? How many oranges would each have?

If four oranges were divided equally between two boys, what part of the four oranges would each boy have? How many oranges would each have?

Two is half of what number?

Four is half of what number?

One is half of what number?

Three is half of what number?

If an orange were divided equally among four boys, what part of the orange would each boy have?

If four oranges were divided equally among four boys, what part of the four oranges would each boy have? How many oranges would each boy have?

If eight oranges were divided equally among four boys, what part of the eight oranges would each boy have? How many oranges would each boy have?

One is one-fourth of what number?

Two is one-fourth of what number?

Jamie has two two-cent pieces of money and three cents. How much money must he earn to have nine cents?

A boy had nine clothes-brooms to sell. When he had sold all but two, how many had he sold?

If you bought two papers of needles for six cents, and gave in payment a five-cent piece and a three-cent piece, how much change should you receive?

For eight cents, how many plums at three cents each can you buy, and how many cents will you have toward buying another plum?

For seven cents, how many tops at four cents each can I buy, and how many cents will be left?

Six and Three.

Show me six blocks. Now show me half as many more. How many have you shown me in all?

Show me six buttons; put with them half as many buttons as you have shown me. How many buttons have you now?

In one keg were six gallons of maple syrup, and in another three gallons. How many gallons were in both kegs?

If the postage on a package was six cents, and the postage on a letter three cents, how much was the postage for both?

Three boys started fishing; they met three other boys who went with them. If three more had gone with them, how many would have gone fishing?

James earned two cents one day, twice as much the next day, and three cents the next day. How many cents did he earn in all?

I have a five-cent piece, one cent, and a three-cent piece. How much money have I?

• I have a pitcher which holds a pint and a half and three gills more. How many gills does the pitcher hold?

If I work six hours during the day, and three hours in the evening, how many hours do I work in all?

I can see four doves, two blue-birds, and three robins. How many birds can I see?

Tell me a story about six and three. Another; another; another.

Write: Six and three are nine.

Three and Six.

Show me three pencils; put with them twice as many pencils. How many pencils have you? Show me this with lines on the board; with dots on the board; with splints at the table; with squares of paper.

If I tell you *three* stories about three and six, and you tell me twice as many stories, how many stories shall we both tell?

If there were three boys on one sled, and twice as many on another sled, how many boys were on both sleds together?

If there were three milk-cans right side up on the bench, and twice as many turned down, how many milk-cans were there on the bench?

If I walk three miles in this direction, and you travel twice as far in the opposite direction, how far apart shall we be?

If a pen and pen-holder cost three cents, and a bottle of ink cost six cents, how much do both cost?

If you have three half-dollars and I have six half-dollars, how many half-dollars have we both together?

Tell me about three hens and six hens; about three lamps and six lamps; about three flags and six flags; about three combs and six combs; about three saws and six saws; about three horses and six cows; about three robins and six swallows; about three lambs and six sheep; about three knives and six spoons.

Write: Three and six are nine.

Nine minus Three.

Show me nine fingers; shut down three. How many fingers do you now show me?

Here are nine cents ; give me three of them. How many cents are left ?

Here are nine dots arranged in several ways on the board. Erase three in each case and see how many remain.

Nine ducks were in the pond, but three went out on the bank. How many ducks were then in the pond ?

There are nine dots on the card I have here. Three dots are on one half, how many dots are on the other half ?

The school-bell rings nine times during the day. If it rings three times in the afternoon, how many times does it ring in the morning ?

I had nine cents and bought a three-cent postage-stamp ; how many cents had I left ?

There were nine doves on the walk, but three flew up on the roof. How many remained on the walk ?

I had nine callers to-day ; three came in the morning, and the others in the afternoon. How many came in the afternoon ?

A hen had nine chickens, but a weasel caught three of them. How many were left ?

A boy who had nine cookies ate three. To how many boys could he give the rest of his cookies if he gave two to each boy ?

Alice found nine pins ; three were bent, and half of the rest had no points. How many were good to use ?

Gertie had nine gold beads. She gave three of them away, lost half of the rest, and afterwards lost two more ; how many beads did she have left ?

Nettie had nine Easter eggs. She kept three herself and divided the rest between her sisters, giving them three apiece. How many sisters had she ?

Nellie spent nine days in the city ; three days were rainy,

and she stayed in the house; half of the other days and one more day she rode and walked about the city. How many more days had she to stay in the city?

Write: Nine minus three are six.

Nine minus Six.

Here are nine lines. Cover six with your hand and tell me how many you can see.

Make nine i's on the board. After you had made six, how many more had you to make?

Here are nine nuts. Give six to Mary. How many have you?

Of nine chairs in our dining-room, only six have cane seats. How many have not cane seats?

There are nine pencils on my desk. Three are not sharpened, and three are too short to use. How many are fit for use?

I spent nine cents this morning. I bought three papers of needles at two cents a paper, and spent the rest for hat-pins at a cent a pin. How many pins did I buy?

I have nine pet mice. Three are white, three are brown, and the rest are black. How many are black?

John has nine glass marbles. Two are striped with red, four are green, and the rest are purple. How many are purple.

Here are nine cents. Two cents belong to Fred, twice as many to George, and the rest to me. How many cents belong to me?

Here are nine blocks. If you put one block in a pile by itself, two blocks in another pile, and three in another, how many blocks will remain for the fourth pile?

Tell me a story for nine minus six. Another; another.

Write: Nine minus six are three.

Nine divided by Three.

Pick out nine blocks. Put them in piles of three each. How many piles have you?

Take nine cups. Pile them up, three in each pile, and see how many piles you have.

Distribute these nine pencils, giving three to each child. To how many children have you given them?

Here are nine cents. To how many three-cent pieces are they equal?

How many three-cent stamps can I buy for nine cents? How many three-cent pencils? How many three-cent books? How many three-cent cards? How many three-cent spools of cotton?

If a newspaper is sold for three cents, and the newsboy has taken nine cents, how many papers has he sold?

When blueberries are three cents a pint, how many pints can I buy for nine cents?

How many pints of milk can I buy for nine cents, when milk is three cents a pint?

If an apple costs one cent, and a pear two cents, how many apples and pears can I buy for nine cents?

If an orange costs two cents, and a stick of taffy one cent, how many oranges and sticks of taffy can I buy for nine cents?

If a pen costs one cent, a pencil one cent, and a star-book one cent, how many pens, pencils, and star-books can I buy for nine cents?

At each board there are three crayons. How many boards will nine crayons supply?

If Eddie earns three cents a day, how many days must he work to earn nine cents?

I have nine pieces of apple here. If three of them will make a whole apple, how many whole apples have I?

I have nine finger rings. If I should wear three on each finger, on how many fingers should I wear them?

In a barge three persons can sit on a seat; how many seats must the barge contain for nine persons?

You may tell me a story about the number of threes in nine.

Write: There are three threes in nine.

Three Threes.

Show me three squares on the board with three dots in each square. How many dots do you show me?

Show me three triangles with a dot in each corner. How many dots do you show me?

How many corners have three triangles?

How many sides have three triangles?

On each of these three plates are three buttons which we will call apples. How many apples are on all the plates?

Show me three piles of blocks with three in a pile. How many blocks do you show me?

Show me three boxes with three splints in each box. How many splints do you show me?

Call your splints spoons, and show me three cups with three spoons in each cup. How many spoons do you show me?

If there are three birds' nests with three eggs in each nest, how many eggs are in all the nests?

In each of these boxes are three dozen crayons. How many dozen crayons are there in three boxes?

If I have three cents, and Alice has three times as many cents, how many cents has Alice?

In one can are three pints of milk, and in another are three times as much milk. How many pints of milk in the other can?

Mabel learns three new words a day. If Willie learns three times as many words, how many words does Willie learn?

I can walk three miles an hour. How far can I walk in three hours?

Here are three blocks in this row. In the longer row are three times as many blocks. How many blocks are in the longer row?

This line is three inches long. The line above it is three times as long. How long is the longer line?

One pail holds three pints. Another pail holds three times as much. How many quarts does the larger pail hold?

One pitcher contains three gills. Another contains three times as many gills. How many pints does the larger pitcher hold?

Tell me a story for three threes are nine.

Write: Three threes are nine.

Exercise for Review.

If a bunch of envelopes costs six cents, and a stamp three cents, how much do both cost?

A fly has six legs. If he had three more legs, how many legs would he have?

Two lilies, four pansies, and three geranium blossoms are how many blossoms?

There were nine spoons in the spoon-holder, but I have taken out three. How many remain in the spoon-holder?

Nine ants were carrying off a big bug, but three of them left off to rest. How many were then carrying away the bug?

Nine flies were in the spider's web this morning, but he has eaten three. How many are left in the web?

I bought six pencils, used four, then bought seven more, and used three. How many pencils did I then have?

In the barn are three swallows' nests. If six more are built, how many swallows' nests will there be?

In my work-basket are three spools of white thread, and six spools of dark thread. How many spools of thread are in my work-basket?

If I should use two spools of white thread, and four spools of dark thread, how many spools would remain?

In a basket are nine eggs. If I use half a dozen eggs, how many eggs will there be in the basket?

If a pail holds nine pints of water, and there is in the pail a quart and a half of water, how many more pints will the pail hold?

Six and how many are nine?

Three and how many are nine?

Nine minus six are how many?

Nine minus three are how many?

Nine minus what number leaves three?

Nine minus what number leaves six?

Three girls going berrying have each a three-pint pail. If each gets her pail full, how many pints of berries will they bring home? How many quarts of berries and what part of a quart beside?

If one whistle costs three cents, what will three whistles cost?

Which will hold the more, three three-pint pails, or a four-quart pail? Two three-pint pails, or a three-quart pail? A three-pint pail, or a two-quart pail? A quart measure, or a pitcher that holds eight gills.

Which will measure the more, two pieces of lace each three inches long, or three pieces of lace each two inches long? Four strips of braid each two inches long, or two strips of braid each four inches long?

If this square box is two inches on each side, how many inches is it around the box?

If the two longer sides of this box are each two inches long, and the shorter sides each an inch, how far is it around this box?

It is two miles to the post-office, and three times as far from the post-office to the depot. How far is it to the depot?

There is nothing in this box. How much will there be in nine such boxes?

If two apples cost a cent, how much will four apples cost? six apples? eight apples?

If you and I have each four apples, but two of mine are not good, how many of yours must you give me that I may have just as many good apples as you have left?

What two numbers, one of which is twice as large as the other, make nine?

I will give a number, and you may give me the number which put with mine will make nine: two; seven; three; six; one; eight.

Give me a number which put with the number I give you will make eight: one; two; four; six; three; five; seven; eight.

Nellie bought three lemons, at three cents apiece. She gave three pieces of money in payment. What were the pieces of money?

Harry had nine cents, and spent three cents; Fred had four cents, and earned four more cents. How much more money had Fred, at last, than Harry?

If I have eight cents, and spend a cent a day, and you have none, but earn a cent a day, in how many days shall we have the same amount?

What three different numbers added together make six?

From what number can you subtract half of itself and leave two? leave three? leave four?

Two halves of an apple are how many apples?

Two halves of two apples are how many apples?

Two halves of four apples are how many apples?

Two halves of six apples are how many apples?

Five and Four.

Take nine blocks. Separate them into two groups, one of which groups shall contain one more block than the other. How many in the larger group? How many in the smaller group? Five blocks and four blocks are how many blocks?

Show me five splints, and four splints. How many splints do you show me?

Show me five fingers on one hand, and four on the other hand. How many fingers do you show me?

Find five red squares, and four blue squares. How many squares have you found?

There are five dots on one half of this card, and four dots on the other half. How many dots are on the card?

In one hand I have five yellow disks; in the other hand I have one less than five disks. How many disks have I in both hands?

Here is a three-cent coin, a two-cent coin, and four cents. How many cents are they worth?

Alice bought five lead pencils for a cent apiece, and four slate pencils at a cent apiece. How much did the pencils cost?

James bought a book for three cents, a pop-gun for two cents, and two candy mice at two cents apiece. How many cents did he spend?

Addie made seven 7's on her slate, erased two, and then made four more. How many 7's were then on her slate?

A train of cars ran eight miles, then backed three miles, then went ahead four miles to the next station. How far was it between the stations?

One boat went up the river five miles, and another boat went down the river four miles. If the boats started from the same point, how far apart were they then?

Who thinks of a story about five and four?

Mary? Alice? Annie? Susie? Ned? John?

Write: Five and four are nine.

Four and Five.

Four squirrels lived in the hollow of a tree, and five more squirrels had their nests in the ground, not far from the tree. How many squirrels lived quite near each other?

A man planted four acres of corn, and five acres of potatoes. How many acres did he plant?

In the youngest class there are four girls and five boys. How many children are in the class?

Four doves were on the sidewalk, and five more alighted on the sidewalk. How many doves were then on the sidewalk?

Four lamps are in one row, and five lamps in another. How many lamps are in both rows?

A pint cup holds four gills. If a pitcher holds one gill more than the pint cup, how many gills will both hold?

Here are two two-cent coins and a five-cent coin. To how many cents are they equal?

Nellie has found four four-leaved clovers; Mary has found as many, and one more. How many four-leaved clovers have they found together?

There are four crocus blossoms in my garden, and one more than as many tulip blossoms. How many blossoms in all?

School has kept two weeks, but Hubert came only four days last week. How many days has Hubert been to school this term?

How many cents will two two-cent stamps, and a five-cent stamp, cost?

Harry and Mary were hunting for eggs; Harry found four, and Mary found one more egg than Harry. How many eggs did both find together?

Some hens and turkeys are out by my window. There are four hens, and one more turkey than hens. How many hens and turkeys are there, counted together?

Tell me a story for four and five.

Write: Four and five are nine.

Nine minus Four.

There are nine dots in each one of these squares on the board. You may erase four dots in one of the squares. How many dots remain? Erase four in another square. How many are left? Erase four in each square. How many dots are in each square now?

If there are nine dots in a square, and four are erased, how many dots remain?

• There are nine lines on each of these boards. Erase four lines on each board. How many remain on each board?

Show me nine squares of paper. Put four squares under the table. How many squares are left?

Show me nine horses. Drive away two spans. How many spans and what part of a span remain?

I have nine gloves. If I send away two pairs to be cleaned, how many pairs of gloves are left, and what part of a pair, beside?

A boy who had nine rabbits sold three and gave away one. How many did he then have?

A boy playing ninepins knocked four ninepins down with the first ball. How many ninepins remained standing?

Nine boys were playing base-ball. Four of the boys left the game. How many boys were left to play?

James earned three cents a day for three days, and spent four cents. How many cents had he then?

There are three boys and six girls in my middle class. Four of the class have paid their book-rent. How many have not paid their book-rent?

Tell me a story for nine minus four.

Write: Nine minus four are five.

Nine minus Five.

Take nine blocks. Who will find soonest how many blocks remain after taking five away? Tell me a story for this fact. Tell me a story for nine pens minus five pens; nine tops minus five tops; nine bells minus five bells; nine cups minus five cups; nine books minus five books; nine plates minus five plates; nine cents minus five cents; nine sheep minus five sheep; nine buns minus five buns.

There are nine shelves to my bookcase; five are wide and the others narrow. How many are narrow?

If a milk-can holds nine quarts, and five quarts have been sold, how many quarts of milk remain in the can?

Harry peddles newspapers. He has nine papers left; five are dailies, and the rest weeklies. How many are weeklies?

Ned has a cent each day for carrying the milk. If he has carried the milk nine days, how many cents more than five cents ought he to receive?

I have here a two-cent piece, two three-cent pieces, and a cent. If I give you a three-cent piece and a two-cent piece, how many cents shall I have?

Henry has been to school nine days. If the school-week is five days, how many days over a week has he been to school?

I bought nine cents' worth of stationery this morning, and paid for it with a five-cent piece and some two-cent pieces. How many two-cent pieces did I pay?

Write: Nine minus five are four.

Nine minus Nine.

Robert had nine marbles. He lost five, and gave away four. How many marbles did he then have?

Mary invited nine little girls to supper. Two sat at one end of the table, three on each side of the table, and one sat beside Mary at the other end of the table. How many more little girls were there to be seated?

If I have nine cents, and buy a top for John for four cents, and some nuts for Annie for five cents, how many cents have I left?

Nellie had nine paper dolls. She gave away seven, and the dog chewed two. How many paper dolls did she then have?

There were nine rabbits in the yard, but when a dog ran into the yard three ran into the stable, and six scampered under the piazza. How many were then in the yard?

We had nine little chickens, but a weasel caught two, a hawk caught one, three got drowned, and three others ate something which killed them. How many of our nine chickens have we now?

We had nine cats when we lived on the farm; three were white, two were black, four were gray, and the rest yellow. How many were yellow?

Nine children owe me for their writing-books. If seven

pay me to-day, and two to-morrow, how many will still owe me?

If a farmer has only nine quarts of oats, and gives his horse a quart each meal for three days, how many quarts will he have left?

If I have nine envelopes, and I send off three letters one day, four letters the next day, and two letters the next day, how many envelopes shall I have left?

Tell me a story for nine minus nine.

Write: Nine minus nine is none.

Nine Ones.

Here are nine cards, with a dot on each card. How many dots are there?

There are nine slates on the desks, and a pencil on each slate. How many pencils are there in all?

Each slate pencil cost a cent. How many cents did the nine slate pencils cost?

How many cents would nine sticks of candy cost, if each stick of candy cost a cent?

Nine boys have each a knife. How many knives have they together?

Charlie receives a cent for every newspaper he sells. How many cents will he receive for selling five newspapers in the morning and four newspapers in the afternoon?

A man earns a dollar a day. If he works three days a week for three weeks, how many dollars will he earn?

If each bottle has a stopple, how many stopples will nine bottles have?

If I send off four letters a day for two days, and one letter the next day, how many envelopes shall I need for my letters?

Write: Nine ones are nine.

Nine divided by One.

Take nine buttons. Put one button into each box. How many boxes does it take?

Mary has nine *i*'s to make. If she writes one *i* on a line, how many lines will it take?

If you have nine erasers, and put one at each board, how many boards can you supply with erasers?

How many days will it take you to earn nine cents, if you earn a cent a day?

Johnnie wants a watch, which costs five cents, and two glass marbles, which are two cents apiece. If he earns a cent a day, in how many days can he earn enough to buy the watch and the glass marbles?

Harry earns three cents a day, Willie only one cent a day. How many more days will it take Willie to earn nine cents than it takes Harry?

Oranges are three cents apiece, plums only a cent apiece. How many more plums than oranges can you buy for nine cents?

How many more vases at a dollar a vase can I buy for nine dollars, than vases at three dollars apiece?

Nine divided by Nine.

How many nine-cent loaves of bread can I buy for nine cents? How many nine-cent books? How many nine-cent toys? How many nine-cent pictures? How many dozen pencils, at nine cents a dozen? How many slates, at nine cents apiece? How many dozen pens, at nine cents a dozen? How many quarts of berries, at nine cents a quart? How many pounds of dates, at nine cents a pound? How many half-pounds of candy, at nine cents a half pound?

If it takes nine buttons for a boot, and Nellie has but nine buttons, how many boots can she supply with buttons?

I have some scales which will weigh anything not heavier than nine pounds. How many packages, nine pounds each, can I weigh at once with the scales?

If starch is put up for sale in nine-pound packages, how many packages must I buy to purchase nine pounds of starch?

§ 30. COMPARISON OF NINE WITH NUMBERS KNOWN.

There are nine little girls playing "drop the handkerchief," and nine boys playing ball. How many more girls than boys are there?

Here are nine cards on the table, and there are nine balls on the desk. How many more cards than balls are there?

I have two three-cent pieces, and three cents; Annie has four two-cent pieces, and one cent. Which has the more money?

On my boot there are nine buttons; on Nellie's there are eight. How many more buttons are there on my boot than on Nellie's?

I sold nine pencils to one class this morning, and eight to another class. How many more pencils did I sell to one class than to the other?

George has nine chickens, and eight ducks. How many more chickens than ducks has he?

There are nine doves on the roof, and seven on the walk. How many more doves are on the roof than on the walk?

Nine new tin pans have blown off of the bench, and seven remain on the bench. How many more have blown off than remain on the bench?

Nine hay-cocks have blown over, but seven are left standing. How many more have blown over than are left standing?

Harry's bedtime is nine o'clock; Jennie's is seven o'clock. How many hour's later is Harry's bedtime than Jennie's?

Sarah has picked nine quarts of strawberries; Irene has picked but seven quarts. How many more quarts has Sarah picked than Irene?

A bicycle will run nine miles an hour; a horse will go six miles an hour. How many more miles an hour will a bicycle go than a horse?

I bought some black-headed pins for nine cents a dozen, and some needles for six cents a paper. How much more did the dozen pins cost than the paper of needles?

You are to have a vacation of nine weeks; I am to have one of six weeks. How many more weeks do you have than I?

Nine children are busy doing number-work; six others are writing. How many more are doing number-work than writing?

It is nine miles to the lake, and six to the mountain. How much farther is it to the lake than to the mountain?

John earned nine dollars doing errands in vacation; Fred earned five dollars. How much more money did John earn than Fred?

In one field there are nine acres; in another there are only five acres. How many more acres in one field than in the other?

Edward can name nine different numbers; Susie can name but five. How many more numbers can Edward name than Susie?

Nettie brought me nine different kinds of leaves this morning. I expected she could find only five different kinds of leaves. How many more did she find than I expected she would?

Bennie has finished nine pages of his writing-book; Lizzie has finished but five of hers. How many more pages has Bennie written than Lizzie?

Here are nine blocks, and here are four blocks. How many more blocks are in one pile than in the other?

There are nine lamps up and down Main Street; no other street in the village has more than four lamps. How many more lamps has Main Street than any other street in the village?

There were nine birds' nests in the trees about our house, last year; this year I have seen but four. How many more were there last year than this?

The train got in at four minutes past three, and left at nine minutes past three. How long did it wait?

I bought at the bakery a nine-cent loaf of bread, and a four-cent roll. How much more did I pay for one than for the other?

Ned bought a blank-book and a pencil this morning. He gave nine cents for the book and three for the pencil. How much more did he give for the book than for the pencil?

Alice is nine years old; her little sister is three years old. How much older is Alice than her sister?

I have a long, narrow book; it is nine inches long, and three inches wide. How many more inches in its length than in its width?

In one dish there are nine bunches, of grapes, and in another dish there are three bunches of grapes. How many more bunches in one dish than in the other?

I bought a quart of strawberries for nine cents, and a pint of milk for three cents. How much more did I pay for the strawberries than for the milk?

I bought a bottle of ink for nine cents, and a pen for two cents. How much more did I pay for the ink than for the pen?

I have a pail which holds four quarts and a pint. How many more pints does it hold than a quart measure?

Jennie found nine straight pins, and two bent ones. How many more straight ones did she find than bent ones?

Lilian has taken nine lessons on the piano, and Mary two. How many more lessons has Lilian taken than Mary?

In the street-car to-day there were nine persons on one side, and two on the other side. How many more persons were on one side than on the other?

In the harbor there are nine sail boats, and one boat without a sail. How many more boats are there with sails than without?

One hen has nine chickens; another hen has only one chicken. How many more chickens has one hen than the other?

Ida has nine sticks of candy, and her little brother has only one. How many more sticks of candy has Ida than her brother?

There were nine boys, and only one little girl, in one of my classes. How many more boys than girls were there in the class?

There were nine persons in our room yesterday, and only one chair. How many more persons than chairs were there?

Nine is how many more than one?

One is how many less than nine?

Nine is how many more than two?

Two is how many less than nine?

Nine is how many more than three?

Three is how many less than nine?

Nine is how many more than four?

Four is how many less than nine?

Nine is how many more than five?

Five is how many less than nine?

Nine is how many more than six?

Six is how many less than nine?

Nine is how many more than seven?

Seven is how many less than nine?

Nine is how many more than eight?

Eight is how many less than nine?

Nine is how many more than nine?

Nine is how many less than nine?

I have made one pen-wiper. How many more must I make to have nine?

Hattie has two dolls; Jane has nine. How many more must Hattie receive to have as many as Jane?

Flora has only three words written; Alice has nine. How many more words must Flora write to have as many as Alice?

I have four cents. How many more cents must I have that I may buy a yard of cambric for nine cents?

Cyrus has five cents; his sister has nine cents. How much must Cyrus earn that he may have as much money as his sister?

Ellen has six picture books. How many more must she get that she may have nine?

Lottie is going away to stay a week. If she should stay nine days, how many days over a week would she stay?

Fred has picked eight quarts of berries. How many more quarts must he pick that he may have nine quarts?

Nine is one more than what number?

Nine is eight more than what number?

Eight is one less than what number?

One is eight less than what number?

Nine is two more than what number?

Nine is seven more than what number?

Seven is two less than what number?

Two is seven less than what number?

Nine is three more than what number?

Nine is six more than what number?

Six is three less than what number ?
Three is six less than what number ?
Nine is four more than what number ?
Nine is five more than what number ?
Five is four less than what number ?
Four is five less than what number ?
Nine is nine more than what number ?

Exercise for Review.

I bought two spools of thread at three cents apiece, and three needles at a cent apiece. How much did I pay for all ?

A man bought a roll of tape for five cents, and a thimble for two cents, and sold them for nine cents. How much did he gain ?

I sold a man a pint of blueberries for four cents, and a pint of raspberries for three cents, and he sold each for a cent more a pint. How much did he gain ?

A man bought four paper dolls for a cent, and then sold them for a cent apiece. How much did he gain ?

Joseph bought a toy ship for five cents, and a banana for three cents, then sold his ship for as much as he paid for both ship and banana. How much did he get for his ship ?

A boy who was selling fruit bought four pears for a cent, and six apples for a cent ; he sold his pears for a cent apiece, and his apples at two for a cent, how much did he gain ?

A man bought oranges at three cents apiece, and sold them for five cents apiece. How much did he gain on four oranges ?

A merchant bought sugar for seven cents a pound, and sold it for nine cents a pound. How many pounds did he have to sell to gain eight cents ?

I had eight cents, and spent half of my money, then earned two cents more. If I spent half of what I then had, how much did I spend?

A peck basket holds eight quarts. How many quarts will a half-peck basket hold?

If tomatoes are three cents a quart, what will three quarts of tomatoes cost?

I bought a yard of narrow ribbon for three cents, a silver-headed pin for two cents, and some tissue paper for four cents. How much did I pay for what I bought? I gave in payment three pieces of money that were just equal to nine cents. What may the three pieces of money have been?

One-half of four apples put with one-half of six apples will make how many apples?

One-fourth of eight apples put with one-fourth of four apples will make how many apples?

Two-fourths of eight splints put with two-fourths of four splints will make how many splints?

A toy balloon could be bought for eight cents. Roy had only one-fourth enough money to pay for it. How much more money did he lack?

I bought some fruit for eight cents, which was twice as much as I expected to pay for it. How much did I expect to pay for the fruit?

It is two miles to the village, and four times as far to the beach. How much farther is it to the beach than to the village?

Lizzie has seven dolls; if she had one more she would have twice as many dolls as Mary. How many dolls has Mary?

Mira has three cents. If I had one more cent I should have three times as many cents as Mira. How many cents have I?

John can earn four cents a day; Susie can earn three cents a day. How much more money will John earn in a week than Susie?

A man bought two sheep at three dollars apiece, and gave in payment a five-dollar bill and a two-dollar bill. How much money ought he to receive back?

I bought two roses at two cents apiece, a bunch of violets for three cents, and a pond-lily for a cent. I gave in payment a five-cent piece and two two-cent pieces. How much change ought I to receive?

In one nest there were three eggs, in another two eggs, and in another four eggs. If I left the nest-egg in each nest, how many eggs did I take away?

I can buy five paper-wrappers for six cents; each paper-wrapper has a one-cent stamp on it. How much do I pay for the paper of which the wrappers are made?

I can buy four envelopes for five cents, each envelope with a one-cent stamp on it. How much do I pay for the envelopes themselves?

I can buy two envelopes for seven cents, each envelope with a three-cent stamp on it. How much do I pay for the envelopes themselves?

I have a table that is three feet wide, and nine feet long. The length of the table is how many times its breadth?

One day I read in a book from page three to page nine (both pages included); how many pages did I read?

Nellie is six years younger than Bennie, and four years younger than Charlie. How much older is Bennie than Charlie?

We had eight children to tea last evening; they consisted of an equal number of boys and girls. How many were boys? How many were girls?

If a snail creeps three inches in half a minute, how many inches will it creep in a minute?

If I write every morning from nine o'clock until twelve o'clock, how many hours shall I write in three days?

Each year has a spring, a summer, an autumn, and a winter. How many seasons are there in a year? How many seasons in two years?

I was at home two years excepting one spring and one autumn. How many seasons was I at home? Name the seasons I was at home.

If a ship sails eight miles an hour, and a horse travels six miles an hour, how much farther than the horse will the ship go in four hours?

Two boats sail toward each other, each at the rate of three miles an hour. If one starts an hour before the other, how much more than half the distance between the two boats will one boat go than the other?

Here are eight cents, with which you may buy two pounds of fish at four cents a pound. How much change should you bring back?

Here are nine cents with which you may buy three pounds of soup beef at three cents a pound. How much change should you bring back?

Here is a five-cent piece and a three-cent piece which you may take to buy a pound of mutton at seven cents a pound. How much change should you bring back?

Here are two three-cent pieces which you may take to buy a bunch of beets at five cents a bunch. How much change should you bring back?

Here is a five-cent piece and a two-cent piece with which you may buy a head of lettuce for six cents and bring back the money you have left. How much money will you have left?

Here are three three-cent pieces which you may take to buy seven pounds of salt at a cent a pound. How much money will you have left?

Here are two two-cent pieces and a five-cent piece which you may take to buy two pounds of soup beef at four cents a pound. How much change should you bring back?

I bought a bunch of beets for five cents and paid for it with three pieces of money. What may the three pieces have been?

I bought two cream cakes at three cents each and paid for them with two pieces of money. What were the two pieces of money if they were equal? if they were unequal?

I bought three bananas at three cents each and paid for them with three pieces of money. What were the pieces of money if they were equal?

The sum of two numbers is nine, and the smaller of the two numbers is four; what is the larger of the two numbers?

The sum of two numbers is nine, and the larger of the two numbers is seven; what is the smaller of the two numbers?

The sum of two numbers is nine, and the smaller of the two numbers is three; what is the larger of the two numbers?

Tom has three marbles, and George has three times as many. How many marbles has George?

The difference between two numbers is three, and the smaller of the two numbers is six; what is the larger of the two numbers?

The difference between two numbers is five, and the smaller of the two numbers is four; what is the larger of the two numbers?

The difference between two numbers is one, and the larger of the two numbers is nine; what is the smaller of the two numbers?

The difference between two numbers is five, and the larger of the two numbers is nine; what is the smaller of the two numbers?

One-Third.

Into how many parts have I divided this circle? (Three.)

Into what kind of parts? (Equal parts.)

Who can fold this piece of paper so as to divide it into three equal parts?

Who can fold this string so as to divide it into three equal parts?

Divide this strip of paper in the same way.

Show me one of the three equal parts into which the circle was divided.

It is a *third* of the circle.

Show me another third of the circle.

Show me the other third of the circle.

Show me a third of the strip of paper; a third of the string; two-thirds of the string.

Divide this square I have drawn on the board into thirds.

Divide the circle beside it into thirds.

Divide this triangle into thirds by drawing lines from the vertex to the base.

Show me what you think to be one-third of this table; one-third of your slate; one-third of this desk; one-third of this blackboard; one-third of this three-inch line. How long is one-third of the three-inch line?

Take three blocks. Divide the number into three equal parts. Show me one-third of three.

Take six blocks. Divide the number into three equal parts. Show me one-third of six.

Take nine blocks. Divide the number into three equal parts. Hold up one-third of nine blocks.

Who knows how many one-third of three is? One-third of six? One-third of nine?

Write: One-third of three is one. One-third of six is two. One-third of nine is three.

CHAPTER IX.

FIGURES. GENERAL REVIEW.

§ 31. FIGURES AND REVIEW.

Write the word that shows this number (one) is meant.

Who will write the number in another way?

All may make the figure 1.

I have three pencils. How many more must I have to make five?

I owe Ned five cents. I have two three-cent pieces which I will give him. How many cents should he give me back?

Three things and how many more things make five things? make seven things? make six things? make eight things?

How many fingers have you on your right hand, beside the thumb? Put a mark on the board for each finger. How many marks have you made?

I will make a figure for the number you have shown me.

Hold up four cards. (Teacher makes the figure 4 on the blackboard.)

Show me four spoons. (Teacher makes the figure 4.)

For how many fingers did I make this figure?

For how many cards did I make this figure?

For how many spoons did I make this figure?

What is this figure?

Show me the number of blocks for which this figure stands; the number of sticks; the number of children; the number of desks.

How many did you show me in each case?

Write the word for which this figure stands.

Make this figure on your slates.

Three and three are how many?

Three and how many are six?

Four and two are how many?

Two and how many are six?

Six minus three are how many?

Six minus two are how many?

Three and how many are five?

One-half of six is how many more than one-half of four?

One-half of six and one-half of four are how many?

I have here two three-cent stamps. How much money did they cost? I paid for them with two pieces of money. What may the two pieces of money have been?

I bought two oranges last week at three cents apiece. What change ought I to have received, if I gave in payment two two-cent pieces and a three-cent piece?

John went down to his father's shop four times in the morning, and twice in the afternoon. How many times did he go altogether?

Four baby carriages and how many more baby carriages make six baby carriages?

Two and how many more are six?

Six pieces of pie less four pieces of pie leave how many pieces of pie?

Six peanuts less two peanuts leave how many peanuts?

How many pints in three quarts?

If you have two pints of milk, how many quarts of milk must you buy that you may have six pints of milk?

We get six eggs every day. If we use two in the morning and two at noon, how many are left?

Mary has four dollars; I have six. How many more dollars have I than Mary?

How much money must I pay for three two-cent stamps? for three three-cent stamps? for nine one-cent stamps? for a half dozen postal cards? for a five-cent stamp and two two-cent stamps?

Find all the twos you can in six. All the threes you can in six. Show me one-half of six; one-third of six.

Tell me a story for what I show you.

Put seven marks on the board.

Write the word *seven*.

This is the figure 7.

Show me the number of marks for which this figure stands.

Show me the word that means the same as this figure.

See how many blocks I show you. (Seven.)

Make the figure that shows this number is meant.

Make the figure that shows this number of balls is meant. (Seven.)

This number of shells. (Seven.)

This number of shells. (One.)

This number of shells. (Four.)

How many different figures have you made? Which is the prettiest? Which is the easiest to make? Which stands for the most things? Which can you do quickest, put seven marks on the board, write the word *seven*, or make the figure 7?

I have four cents and Eva has five cents. We are going to put our money together to buy some sweet crackers. How many cents' worth of crackers can we buy?

Five oyster-shells and four oyster-shells are how many oyster-shells?

Tell me a story for five and four.

If you have nine apples and I have five apples, how many more have you than I?

If you give me two of your apples, who will have the greater number then?

Nine less two are how many more than five and two?

Ralph has nine cents. Lizzie has five cents. How many cents must Ralph give Lizzie that each may have the same number?

In an orchard there are nine trees. If there are two rows of four trees each, how many trees are there besides? Six of these trees blossomed. How many had no blossoms?

I have in my purse a five-cent piece and two two-cent pieces. How many cents have I in my purse? I shall spend my five-cent piece for a bottle of ink. How many cents shall I then have?

Mary is nine years old and Harry is seven. How much older than Harry is Mary? Annie is two years old. How much older than Annie is Mary?

I have here three rows of beans with three beans in a row. How many beans have I?

I have nine cents and Eva has three three-cent pieces. Which one of us is the richer?

If one spool of thread costs three cents, what will three spools of thread cost?

How much will three pints of milk cost at three cents a pint?

It took a man a week and three days to lay a piece of wall. How many days did it take him?

If I can earn a cent every day, how many days over a week must I work to earn nine cents?

If a boy earns a dollar a month, and spends half of what he earns each month, how many months must he work to save four dollars?

If a newsboy buys a paper for four cents and sells it for five cents, how many papers must he sell to gain eight cents?

A boy, who buys apples at the rate of three for two cents, sells his apples at a cent apiece. How many cents does he gain on three apples? How many cents does he gain on twice three apples?

Make nine marks on the board.

Write the word that stands for nine.

Does any one know the figure that shows nine is meant?

I will make it for you.

Show the number of blocks for which this new figure stands.

I will show you a number of things, and you may write the figure that stands for it:

Nine; one; four; seven; nine; four; nine.

Name these figures as I point:

1; 7; 9; 4; 7; 9; 4.

Tell me a story for:

Three minus three.

Six and three.

Four and three.

Seven minus five.

Two twos.

Two threes.

Three twos.

Six minus six.

Five and four.

Nine minus seven.

Six divided by two.

Three threes.

Four twos.

Two fours.

Half a pound of sugar costs four cents. What does a pound cost at that rate?

I bought two oranges for eight cents. One orange cost two cents more than the other. What was the price of each?

If I divided four oranges among some boys, giving them half an orange apiece, to how many boys did I give them?

I gave a five-cent piece and a three-cent piece for two quarts of milk. What was the cost of a pint of milk at that rate?

I measured out a quart of water with a gill cup. How many times did I have to fill the gill cup?

If a pint of milk costs two cents, what will two gills cost at the same rate?

If I spend all my money, how much money shall I have left? You say I shall have none left. I will put on the board the figure 0, which always shows that *none* is meant. Its name is *zero*.

Tell me what you see in this room like it. (Eye-glasses; handle of a mug; letter O on the board.)

Make the figure with your forefinger and thumb. Put it up to your eyes so that you can look through the opening. What shape has your eye?

Notice what I do. (Show three blocks, and then remove them from sight.)

What is the answer? (None.)

Show me the figure that stands for none.

Give me an example such that the answer can be shown by this figure.

I had seven chickens. I sold five and then I sold two. How many had I left? Put on the board the figure that shows how many.

I had five minutes to wait at a railroad station. It took me three minutes to get my ticket and two minutes to say "good bye" all round. How many minutes had I left?

Express the answer on the board.

Show me the figure that stands for one more than none; that stands for four more than none; that stands for seven more than none; that stands for nine more than none; that stands for none.

Make all the figures you know on your slate, and write against each figure its name.

Two twos are how many?

Three twos are how many?

Four twos are how many?

Two threes are how many?

Three threes are how many?

Two fours are how many?

One-third of six is how many?

One-third of nine is how many?

One-fourth of four is how many?

One-fourth of eight is how many?

Tell me a story for:

Three and four.

Nine minus four.

Seven minus four.

Nine minus five.

Seven minus three.

Five and three.

Four and five.

Eight minus three.

Name two numbers which together make six.

Who can make the figure 6?

Express on the board the numbers I show you:

Six; seven; six; nine; four; six; nine.

Name each figure as I point. Which figure expresses the most?

Make the figure 6 on your slates.

Read what I show with the blocks. (Six and one are seven.)

Write this expression, using figures for six, one, and seven. (The expression stands: 6 and 1 are 7.)

Read what you have written.

Read what I show with the blocks. (Seven minus one are six.)

Express this, using figures. (7 minus 1 are 6.)

Read what you have written.

Copy these two expressions on your slates.

Think of a story whose answer is *five*.

Who can put the figure 5 on the board?

Write its name. Show me the number of marks for which it stands. What is the figure?

Read what I show you. (Four and one are five.)

Express this, using figures for the numbers. (4 and 1 are 5.)

Read what you have written.

Read what I write:

4 and 1 are 5.	5 minus 4 is 1.
5 and 4 are 9.	9 minus 4 are 5.
1 and 4 are 5.	9 minus 5 are 4.
5 and 1 are 6.	7 minus 1 are 6.
6 and 1 are 7.	6 minus 5 is 1.

Express with figures what I show you with the blocks:

Five minus one are four.

Six minus one are five.

Five minus five is zero.

Nine minus nine is zero.

Seven minus seven is zero.

Finish the sentences, using figures :

6 and 1 are	5 and 4 are
4 and 1 are	6 and 1 are
5 and 1 are	7 minus 1 are
4 and 5 are	9 minus 4 are
9 minus 5 are	5 minus 1 are
7 and 0 are	9 minus 9 is
9 and 0 are	5 minus 5 is
7 minus 6 is	5 minus 4 is

Draw a line two inches long. Divide the line into two equal parts. Erect a square on each half. How many squares have you drawn ?

Write the word *two*. Express two in some other way. Who knows the figure 2 ? I will make it for you.

Point to the figure that stands for this number. (Two.)

Make the figure that stands for this number. (Two.)

Make the figure for each of the numbers I show you.

I will name a number, and you may point to the figure that stands for the number : One, Two, Four, Five, Six, Seven, Nine, None.

Express in figures the answers to these examples I give you.

If you model in clay five flowers and two animals, how many forms will you have modelled ?

If two of the flowers should crack into pieces, and you should model four more forms, how many forms would you then have ?

Eight boats were drying in the sun yesterday. To-day there are only half as many. How many boats are drying in the sun to-day ?

There were nine panes of glass in the upper sash of a window, but four panes were broken by a swinging blind. How many panes remained unbroken?

I see that Harry has nine peanuts. If he gives me a third of what he has, how many will he have left?

There are nine pencils on my desk. Four of them have rubber tops, three have ivory tops, two have nothing on the top, and the rest have gold tops. How many have gold tops?

Eight children are at the board. Two are drawing, five are writing, and the rest seem to be doing nothing. How many are idle?

Harry has made nine designs with his sticks. Victor has made seven designs. How many more designs must Victor make to have as many as Harry?

Write in words the answers to these examples I give you :

There were six hens in the garden a moment ago, but half of them have gone to roost. How many are in the garden now?

I have eight cents in my pocket in two pieces of money. One of the pieces of money is a five-cent piece. What is the other piece of money?

Two days of last week were too cold, two were too warm, and the rest of the week was very pleasant. How many days were pleasant?

What word have you written each time? (Three.) Who will express three in some other way? Ned has made the *figure 3*. All make the figure 3. All show me the number of fingers for which the figure stands; the number of blocks; the number of pieces of crayon; the number of panes of glass.

Nellie may name a number, and the class express it.
 Addie may name a number. Jennie may name a number.
 Ned may name three numbers.

Willie may point to the figures, and the class may name them.

Finish the sentences I have begun :

4 and 3 are	9 minus 2 are
3 and 2 are	7 minus 3 are
5 and 2 are	7 minus 2 are
6 and 3 are	6 minus 2 are
4 and 2 are	6 minus 3 are
9 minus 3 are	5 minus 3 are
2 twos are	2 threes are
3 twos are	7 ones are
3 threes are	3 ones are

What number added to five will give eight? added to four? added to three? added to six? added to one? added to two?

Think of two numbers which added together will give eight for the answer.

What number made less by four is four? made less by three is five? made less by two is six? made less by seven is one? made less by eight is none?

Who knows what figure to write for eight? Write the figure 8.

Who has a story whose answer is eight?

Write eight figures that you know.

Name the figures you have written.

Write two more figures that you know.

Name the figures as I point.

When I point to a figure, you may point to one that stands for two more than the figure to which I point.

Show me with the blocks what these stories mean :

4 and 4 are 8.	8 minus 4 are 4.
5 and 3 are 8.	8 minus 5 are 3.
7 and 1 are 8.	8 minus 2 are 6.
6 and 2 are 8.	8 minus 1 are 7.
3 and 5 are 8.	8 minus 3 are 5.
4 twos are 8.	8 divided by 2 are 4.
2 fours are 8.	8 divided by 4 are 2.
8 ones are 8.	8 divided by 1 are 8.

Express in figures the answers to these examples I give :

A wood sawyer cuts each stick into three pieces. How many cuts does he make in sawing a stick of wood? in sawing two sticks of wood? in sawing four sticks of wood?

If peaches are selling at the rate of two for a cent, how many peaches can I buy for four cents? for two cents? for three cents? At the same rate how much will six peaches cost? will eight peaches cost? will four peaches cost?

Jessie is two years old to-day. In how many years will she be twice as old as she now is? In how many years will she be four times as old as she now is?

Four years ago Mary was only half as old as she now is. How old is she now? How old was she four years ago?

In three years Bessie will be twice as old as she now is. How old is Bessie now?

A boy worked at haying for a dollar a day. How many dollars did he earn in working a week and a half?

Harry said to Tom, "I have three torpedoes left; how many have you?" Tom answered, "I have twice as many as you, and one more; guess how many I have." How many do you guess Tom had?

How many half-pound weights must be placed in one scale-pan to balance four and a half pounds of shot in the other scale-pan?

If a locomotive goes at the rate of half a mile a minute, how many miles will it go in eight minutes? At the same rate, how long will it take a locomotive to go two and a half miles? three and a half miles? four and a half miles?

I saw on a shelf in a tin-shop a quart pan, and, arranged around the pan, as many gill cups as would be required to hold as much as the quart pan. How many gill cups were arranged around the pan?

What part of this circle do I show you? (One-half.)

What part of this square? (One-half.)

What part of two is one?

What part of four is two?

What part of six is three?

What part of eight is four?

Who can express *one-half* on the board, using figures?

I will express it. Read what I write:

$\frac{1}{2}$ of 2 is 1.

$\frac{1}{2}$ of 6 is 3.

$\frac{1}{2}$ of 4 is 2.

$\frac{1}{2}$ of 8 is 4.

One-half of 1 is one-half.

Express the last sentence, using this new sign, $\frac{1}{2}$.

Complete these sentences:

$\frac{1}{2}$ of 8 is

$\frac{1}{2}$ of a quart is

$\frac{1}{2}$ of 2 is

$\frac{1}{2}$ of a pint is

3 is of 6.

1 pint is of a quart.

4 is of 8.

2 gills are of a pint.

Express in figures the answers to these examples:

A hen had eight chickens. One got drowned, and one always stays in the coop with its mother. How many chickens go wandering off by themselves?

If three of the six get into the garden, what part of the number is in the garden?

How many handles have four trunks, if two of them have but one handle each?

How much will the stamps for four letters cost, if two letters require but a cent stamp each?

If two men saw *thréé* cords of wood in a day, how many cords of wood will they saw in three days?

If three newspapers sold for nine cents, what was the price of each newspaper?

If six apples sold for three cents, what was the price of one apple?

What will three and a half yards of edging cost, at two cents a yard?

Four cents will buy how many plums, at half a cent each?

Three cents will buy how many paper dolls, if two can be bought for a cent?

Nine cents will buy how many five-cent whistles? how many more cents are needed to buy another whistle?

Eight cents will buy how many five-cent bags of pop-corn? How many more cents are needed to buy another bag of pop-corn.

Divide this line into four equal parts. What part of this whole line is each part, if you have divided the line equally?

Who knows how to express *one-fourth*, using figures?

All write one-fourth this new way, $\frac{1}{4}$.

Read what I have written:

$\frac{1}{4}$ of 4 is 1.

1 gill is $\frac{1}{4}$ of 1 pint.

$\frac{1}{4}$ of 8 is 2.

2 gills are $\frac{1}{4}$ of 1 quart.

1 is $\frac{1}{4}$ of 4.

$\frac{1}{4}$ of 1 pint is 1 gill.

2 is $\frac{1}{4}$ of 8.

$\frac{1}{4}$ of 1 quart is 2 gills.

Divide the square that I have drawn on the board into eight equal triangles.

What part of the square is each triangle?

Who can express *one-eighth* a new way?

Ned may express *one-eighth* the new way in each triangle.

All express : $\frac{1}{8}$; $\frac{1}{4}$; $\frac{1}{2}$.

Write: $\frac{1}{8}$ of 8 is 1.

1 is $\frac{1}{8}$ of 8.

$\frac{1}{8}$ and $\frac{1}{8}$ are $\frac{2}{8}$.

$\frac{1}{4}$ and $\frac{1}{4}$ are $\frac{2}{4}$.

$\frac{2}{8}$ and $\frac{1}{8}$ are $\frac{3}{8}$.

$\frac{2}{4}$ and $\frac{1}{4}$ are $\frac{3}{4}$.

$\frac{1}{2}$ and $\frac{1}{2}$ are 1.

$\frac{2}{4}$ and $\frac{2}{4}$ are 1.

$\frac{4}{8}$ and $\frac{4}{8}$ are 1.

$\frac{1}{8}$ of 1 quart is 1 gill.

1 gill is $\frac{1}{8}$ of 1 quart.

$\frac{2}{8}$ minus $\frac{1}{8}$ is $\frac{1}{8}$.

$\frac{2}{4}$ minus $\frac{1}{4}$ is $\frac{1}{4}$.

$\frac{3}{8}$ minus $\frac{1}{8}$ is $\frac{2}{8}$.

$\frac{3}{4}$ minus $\frac{1}{4}$ is $\frac{2}{4}$.

$\frac{1}{2}$ minus $\frac{1}{2}$ is 0.

1 minus $\frac{2}{4}$ is $\frac{2}{4}$.

1 minus $\frac{1}{2}$ is $\frac{1}{2}$.

Who will express *one-third* a new way? Express it.

Write: $\frac{1}{3}$ of 3 is 1.

1 is $\frac{1}{3}$ of 3.

$\frac{1}{3}$ of 6 is 2.

2 is $\frac{1}{3}$ of 6.

$\frac{1}{3}$ of 9 is 3.

3 is $\frac{1}{3}$ of 9.

$\frac{1}{3}$ and $\frac{1}{3}$ are $\frac{2}{3}$.

$\frac{2}{3}$ and $\frac{1}{3}$ are 1.

$\frac{2}{3}$ minus $\frac{1}{3}$ is $\frac{1}{3}$.

$\frac{2}{3}$ minus $\frac{2}{3}$ is 0.

Read what you have written.

Finish these sentences:

$\frac{1}{2}$ of 2 is

$\frac{1}{2}$ of 4 is

$\frac{1}{2}$ of 6 is

$\frac{1}{2}$ of 8 is

$\frac{1}{2}$ of 1 is

$\frac{1}{4}$ of 4 is

$\frac{1}{4}$ of 8 is

$\frac{1}{8}$ of 8 is

$\frac{1}{3}$ of 3 is

$\frac{1}{3}$ of 6 is

$\frac{1}{3}$ of 9 is

1 is $\frac{1}{3}$ of

2 is $\frac{1}{3}$ of

$\frac{1}{2}$ of 1 quart is pint.

$\frac{1}{2}$ of 1 quart is gills.

$\frac{1}{4}$ of 1 quart is gills.

$\frac{1}{2}$ of 1 pint is gills.

$\frac{1}{4}$ of 1 pint is gill.

$\frac{1}{8}$ of 1 quart is gill.

1 is $\frac{1}{2}$ of

2 is $\frac{1}{2}$ of

3 is $\frac{1}{2}$ of

4 is $\frac{1}{2}$ of

1 is $\frac{1}{4}$ of

2 is $\frac{1}{4}$ of

1 is $\frac{1}{8}$ of

CHAPTER X.

THE NUMBER TEN. THE SIGNS: =, +, —.

§ 32. THE NUMBER TEN.

Place nine blocks on the table in front of you. Put one more block with them. Who knows how many blocks nine blocks and one block are?

Nine blocks and one block are ten blocks.

Nine splints and one splint are how many splints?

Nine horses and one horse are how many horses?

Nine balls and one balloon are how many toys?

Tell me a story for nine and one.

On one side of a building there is an opening left for the door, and nine openings left for windows. How many openings are on that side of the building?

One star shone out in the sky almost as soon as the sun was set, and soon I counted nine more stars. How many stars were to be seen then?

I saw an ant trying to carry off a big bug, but it was too heavy for him; and so another ant came to help him, and then another, and another, until at last nine other ants had come to help the first ant. How many ants were then carrying away the bug?

How many fingers and thumbs have you on both hands? If you had but one thumb, how many fingers and thumbs would you have on both hands together?

In a brood of ten chickens, one chicken was white and the rest were black. How many were black?

Make ten straight marks on the board. Cover nine of them with the eraser. How many marks are not covered?

Here is a ten-cent piece which you may take to buy three bananas at three cents each. How much money should you return to me?

If you buy a yard and a half of cambric at six cents a yard, and give a ten-cent piece in payment, how much money ought you to receive back?

I bought a bunch of envelopes for five cents, and two pencils at two cents each. I gave in payment a ten-cent piece. How much change ought I to receive?

I can ride ten miles on my ticket. If I ride six miles out and half way back, how many more miles can I ride on my ticket?

How many one-cent stamps can I buy for ten cents?

How many postal cards can I buy for ten cents?

How many sticks of candy can I buy for ten cents?

How many rolls of lozenges, at a cent a roll, can I buy for ten cents?

How many buns, at a cent a bun, can I buy for ten cents?

What will ten glass balls cost, at a cent a ball?

What will ten pens cost, at a cent a pen?

What will ten one-cent books cost?

If there is a mirror in each one of ten rooms in a house, how many mirrors are in the house?

An old clock-maker was very fond of buying old and curious clocks. He had one in each one of the ten rooms in his cottage. How many clocks had he?

How many ten-cent loaves of bread can be bought for ten cents?

How many sets of paper dolls, at ten cents a set, can be bought for ten cents?

How many picture-books, at ten cents each, can be bought for ten cents?

Notice how I express *ten* in figures.

What figure have I made? (The figure 1.)

What figure have I now placed against the 1? (The figure 0.)

These two figures show that ten is meant.

All raise right hands. Who will tell me on which side of 1 the 0 stands?

All write *ten* in figures, and think that the zero is on the right-hand side of the figure 1.

Write in figures what I show you with the blocks:

Nine and one are ten.

Ten minus one are nine.

Ten minus nine is one.

One and nine are ten.

Ten ones are ten.

Ten divided by one are ten.

The Sign =.

Who will supply the word that is needed to complete these sentences?

5 and 3	8.	7 minus 4	3.
9 and 1	10.	10 minus 1	9.
4 and 3	7.	9 minus 6	3.
3 threes	9.	9 minus 7	2.
4 twos	8.	10 divided by 1	10.
2 fours	8.	9 divided by 3	3.
10 ones	10.	8 divided by 4	2.

I will show you a new way to make the board say "are" in these sentences. This sign = stands for *are*.

Put this mark where it belongs in the first sentence, and read the sentence. In the second sentence, and read. In the next sentence, and read. Fill each blank, and read.

Complete these sentences :

5 minus 3 =	7 minus 3 =
3 and 2 =	7 minus 4 =
4 and 2 =	3 and 5 =
6 minus 4 =	4 and 5 =
2 and 5 =	8 minus 5 =
7 minus 5 =	9 minus 7 =
3 and 4 =	9 minus 5 =
9 minus 6 =	6 divided by 2 =
9 divided by 3 =	8 divided by 4 =
8 divided by 2 =	6 divided by 3 =
9 and 1 =	10 minus 1 =
1 and 9 =	10 minus 9 =

Show me eight fingers.

How many more fingers have you?

Eight fingers and two fingers are how many fingers?

Find if it is true that eight blocks and two blocks are ten blocks; that eight paper disks and two paper disks are ten paper disks.

Tell me stories for eight and two.

On my rosebush there are two roses and eight buds. How many buds and blossoms are on my bush?

In an excursion party there were two gentlemen and eight ladies. How many persons were in the party?

Eddie is two years old, and Frank is eight. If I give to each as many cents as he is years old, how many cents shall I give to both?

If I have ten cents to spend, and buy a whistle for two cents, how many cents shall I have left?

If there were ten cakes on the plate, and two were eaten, how many cakes were left on the plate?

I bought a pen-holder for ten cents, and Mary bought one for two cents less. How much did Mary pay?

Tell me a story for ten minus two.

There were ten lambs in a flock. Eight of them were white and the rest black. How many were black?

In an orchard there are ten rows of trees. Eight rows are young trees, and the other rows are old trees. How many rows of old trees are there?

Last week berries sold for ten cents a quart. This week they are selling for eight cents a quart. What is the difference in price?

Who has a story for ten minus eight.

Take ten blocks. Call them horses. Arrange them in spans. How many spans of horses are there? Call them oxen. How many yokes of oxen are there?

I have ten cents in two-cent pieces. How many two-cent pieces have I?

If a milliner uses two yards of ribbon for a pair of bonnet-strings, how many pairs of bonnet-strings will ten yards of ribbon make?

On a piece of road, stone posts were erected every two miles. How many posts would one pass in going ten miles on that road?

I have ten quarts of milk. How many two-quart cans can I fill?

Show me five rows of buttons, two buttons in each row. How many buttons do you show me?

If there are five birds, and each bird finds two worms, how many worms will they find together?

If there are five nests, and two birds in a nest, how many birds are there altogether?

I saw five street-cars go by with only the driver and conductor in each car. How many men were there on all the cars together?

Five bicycles have how many wheels?

In five dollars how many half-dollars?

Give an example for what I express on the board :

8 and 2 = 10.	10 minus 8 = 2.
2 and 8 = 10.	10 divided by 2 = 5.
10 minus 2 = 8.	5 twos = 10.

The Sign +.

Who will supply the word that is needed to complete these sentences?

8	2 = 10.	2	8 = 10.
5	4 = 9.	6	3 = 9.
5	3 = 8.	2	7 = 9.
4	3 = 7.	2	6 = 8.

Instead of writing the word "and," we can make a mark which always shows that *and* is meant. It is this, +. Who will describe this sign?

Put it in the first sentence, where you would put the word "and," and read the sentence.

Fill the space in each sentence with this sign. Read the expressions.

Finish these sentences :

2 + 4	5 + 4	2 + 7
5 + 2	4 + 2	3 + 5
4 + 3	3 + 4	6 + 3
7 + 2	8 + 2	2 + 8
2 + 4	3 + 6	2 + 5

Show me seven fingers; show me three more fingers. How many fingers have you shown me altogether?

It sometimes takes a week and three days to go across the ocean. How many days does it take?

In a class at school there were seven girls and three boys. How many children were there in the class?

I bought some dress goods for seven dollars, and trimmings for the dress for three dollars. How much did the material for the dress cost?

I have three days this week to visit, and all of next week. How many days have I to visit?

Three boys are playing tag and seven boys are playing ball. How many boys are playing?

In our little duck-pond there are three old ducks and seven ducklings. How many are there in all?

Who has a story for seven and three?

Who has a story for three and seven?

If I have seven cents and a three-cent piece, how many cents have I? If I give you the three-cent piece, how many cents shall I have?

If you have a three-cent piece and John has a ten-cent piece, how much more money has John than you?

There were ten chickens in one brood and three in another brood. How many more chickens were in one brood than in the other?

Charley had ten newspapers to sell. How many had he left after he had sold three?

There were ten lambs in a flock. Three lambs were sold. How many were there then in the flock? If seven lambs had been sold, how many would have been left in the flock?

A ten-quart can has seven quarts of milk in it. How much more milk will it hold?

I bought ten yards of cloth, and have used seven yards. How much cloth remains in the piece?

A man bought ten pounds of sugar, but seven pounds of the sugar spilled out on his way home. How many pounds had he when he reached home?

There were ten frosted cakes on the table at tea. After each of seven children had eaten one cake, how many cakes remained?

Who has a story for ten minus three?

Who has a story for ten minus seven?

If a bag of peanuts cost seven cents, how many bags of peanuts can be bought for ten cents, and how many cents will be left toward buying another bag?

How many quarts of berries, at eight cents a quart, can be bought for ten cents, and how many cents will be left?

How many dozen pens, at nine cents a dozen, can be bought for ten cents?

How many cents will be left after buying the dozen pens?

Take six blocks. Find how many more you must take to have ten blocks. Six blocks and four blocks are how many blocks?

There were six white pins on a cushion and four black pins. How many pins were on the cushion?

It is six miles to the foot of the mountain, and four miles farther to the lake. How far is it to the lake?

Two triangles and a square have how many sides altogether?

If you have two three-cent pieces and two two-cent pieces, how much money have you?

It will take a farmer a week and four days to finish haying. How many days will it take him to finish baying?

On our street are four elms and six maples. How many trees are on our street?

A lady painted four fans this week and six last week. How many fans has she painted altogether?

In a cottage there are four rooms upstairs and six rooms downstairs. How many rooms are in the cottage?

Who has a story for six and four?

Who has a story for four and six?

If there were ten persons at table, and four of these were children, how many grown persons were there at table?

There were ten little girls looking in at a shop window. Four of them went in to buy something. How many were then looking in at the window?

Jennie has ten words to write. How many will she have to write after writing four words?

I can see ten boats on the pond. Six of the boats have sails. How many are row-boats?

If you have ten weeks' vacation, and spend six weeks of your vacation in the country, how many weeks will remain in your vacation?

If a stake is ten inches long, and six inches are above ground, how many inches of the stake are in the ground?

Who has a story for ten minus four?

Who has a story for ten minus six?

Finish these expressions:

$$6 + 4 =$$

$$10 \text{ minus } 4 =$$

$$4 + 6 =$$

$$10 \text{ minus } 6 =$$

$$4 + \quad = 10.$$

$$10 \text{ minus } \quad = 4.$$

$$6 + \quad = 10.$$

$$10 \text{ minus } \quad = 6.$$

If an orange cost six cents, how many oranges can be bought for ten cents? How many cents will remain after buying the orange?

How many newspapers, at four cents a paper, can be bought for ten cents? What part of the cost of a paper will remain after buying the two papers?

How many fingers have you on each hand? How many have you on both hands?

This pansy has five petals and this pansy has five petals. How many petals have both pansies?

If there are five red morning-glories and five white ones on our vine, how many morning-glories are on our vine?

It is five miles to Chestnut Grove. If I go and return, how many miles do I travel?

Janey is five years old now. How old will she be five years from now?

I bought a book for five cents and a bottle of ink for five cents. How much did both cost?

Who has an example for five and five?

Make five straight lines on the board. Cross each of these lines. How many lines have you made all together?

Express on the board: $5 + 5 = 10$.

Make ten dots on the board. Erase five dots. How many dots remain?

Who has a story for ten minus five?

In a garden there were ten varieties of roses. During a severe winter five varieties died. How many varieties of roses were then in the garden?

A man who works ten hours a day works five hours before dinner. How many hours does he work after dinner?

If you have ten words to copy and copy five of them, how many words will remain to be copied?

John bought two toy shovels for a cent apiece, and a toy hammer for three cents. He gave a ten-cent piece in payment. How much money ought he to receive in change?

Harry earned six cents one week and four cents another week. He then spent five cents. How many cents had he left?

Mary visited her aunt a week and three days last summer, and it rained hard five days while she was there. If it was pleasant the rest of the time, how many days were pleasant?

One hen had two chickens and another hen had eight chickens. If five of these chickens died, how many chickens had the two hens together?

Express on the board: Ten minus five are five.

Here are ten blocks. See how many piles you can make if you put five in each pile.

If a boy sells apples at the rate of five for a cent, how many cents will he get for ten apples?

If a horse travels five miles an hour, in how many hours will he travel ten miles?

How many five-cent stamps can be bought for ten cents? how many five-cent pencils? how many dozen elastic bands at five cents a dozen?

Each think of a story for ten divided by five.

Write on the board: Ten divided by five are two.

Here are two piles of blocks with five blocks in each pile. How many blocks are here? how many fives?

Here are two strings of buttons with five buttons on each string. How many buttons are on both strings? how many fives?

Show me two hands. How many fingers on each hand? how many fingers on both hands? how many fives?

If you had five cents in each hand, how many cents would you have in both hands? how many fives?

Here are two boxes with five cents in each box. How many cents are in both boxes? how many fives?

I have two five-cent pieces. How many cents have I?

If I buy two five-cent books, what must I pay for both books?

If Ella uses five cents' worth of paper each day, how many cents' worth will she use in two days?

How many toes has a cat on two fore-feet?

How many toes has a dog on two feet?

How many petals have two apple-blossoms?

I have five dollars in my purse. I wish I had twice as much money in my purse. How many dollars do I wish I had in my purse?

If there are five desks in a row, and twice as many chairs as desks, how many chairs are there?

This strip of paper is five inches wide, and twice as long as it is wide. How long is this strip of paper?

I can walk five miles without feeling tired. Soon I hope to walk twice as far. How far will that be?

Two fives are how many?

Twice five are how many?

Write: 2 fives = ten.

Each take ten sticks. Show me one-half of the number of sticks you have. How many sticks do you show me?

If a man has ten cows, and sells half of what he has, how many cows does he sell?

If it is ten miles to Boston, how far is it half way there?

I can ride ten miles on my ticket. If I use half of my ticket, how many miles do I ride?

I divided ten pears equally between two boys. How many pears did I give to each?

I have ten cents. If I spend five cents, what part of my money do I spend?

Nettie had ten nuts. She gave me five. What part of her nuts did she give me?

Annie has ten paper dolls. Sarah has none. How many dolls must Annie give Sarah that each may have as many as the other?

Edwin has ten lozenges which he is going to give to John and Henry. If he gives to each the same number, how many will John have?

If a milliner puts ten yards of ribbon on two hats, so that there is just as much ribbon on one hat as on the other, how many yards does she put on each hat?

Who thinks of a story for one-half of ten?

What is one-half of ten?

Write: $\frac{1}{2}$ of 10 = 5.

The Sign —.

Who knows what word I have omitted in each of these expressions?

6	1 = 5.	6	3 = 3.
10	1 = 9.	4	2 = 2.
10	5 = 5.	2	1 = 1.
8	4 = 4.	7	1 = 6.

Read the first expression, supplying the word that is needed. (Let teacher make the sign — instead of writing the word.)

Read the second expression. (Let teacher make the sign —.)

Read the next expression; the next; the next. (Each time the expression is read, let the teacher make the minus sign. When the sign has been supplied in all expressions, have the expressions read again.)

Read what I have written:

10 — 6 = 4.	10 — 2 = 8.
10 — 7 = 3.	9 — 5 = 4.
10 — 8 = 2.	9 — 3 = 6.
10 — 4 = 6.	9 — 7 = 2.
10 — 3 = 7.	9 — 4 = 5.

Write:

Eight minus four are four.
 Seven minus four are three.
 Six minus four are two.
 Nine minus four are five.
 Ten minus four are six.
 Ten minus seven are three.
 Ten minus six are four.

Finish these statements that I have begun :

$10 - 4 =$	$8 - 3 =$
$10 - 6 =$	$8 - 5 =$
$10 - 1 =$	$7 - 5 =$
$10 - 5 =$	$7 - 2 =$
$7 - 3 =$	$8 - 7 =$
$7 - 4 =$	$9 - 7 =$

Exercise for Review.

There were ten little soldiers marching very straight. Two fell out of the line, and then how many were in line?

There were ten pins standing firm and even. I threw a ball and knocked down seven. How many were left standing?

We will call our fingers fairies. If three are ugly fairies, how many are good fairies?

Each of these fairies has a cap. If half have pink caps, and the rest black caps, how many have black caps?

Two of these fairies are clumsy and thick. How many are slender?

Each of the thick fairies has two joints. How many joints have both? Each of the others has three joints. How many joints have three of the others?

Each boy has two ears, two cheeks, two eyes, a forehead and a nose, a mouth and a chin. How many parts has each boy's head?

If each arm has a hand, a wrist, a forearm, an elbow, and an upper arm, how many parts has each arm? How many parts have both arms?

If each tooth has a crown, a neck, and a root, how many parts has each tooth? How many parts have two teeth?

A horse has one toe on each foot. How many more toes have you than a horse?

An ox has two toes on each foot. How many more toes have you than an ox? How many more toes has an ox than a horse?

An ox wears a shoe on each toe. How many more shoes does an ox wear than you?

A hen has four toes on each foot. How many toes has she on both feet?

If one bird has no teeth, how many teeth have ten birds?

Each feather has a stem and a vane. How many stems and vanes together have three feathers? have four feathers? have five feathers?

A squirrel has four toes on each fore-foot, and five toes on each hind-foot. How many toes has he on one fore-foot and one hind-foot. How many toes has he on his fore-feet? How many toes on his hind-feet?

A frog has four toes on each fore-foot, and five toes on each hind-foot. How many toes has a frog on one fore-foot and hind-foot together? How many toes has a frog on his hind-feet?

A grasshopper has three pairs of legs and two pairs of wings. How many legs and wings has a grasshopper, counted together?

If one insect has three eyes in his forehead, how many eyes will three such insects have in their foreheads?

If a hen has four eyelids to each eye, how many eyelids has a hen?

If a spider has four pairs of legs, how many legs has a spider?

Write on the board the figures that stand for the numbers I show you. (In this way test the child's knowledge of figures.)

Read what I show you with the blocks, then express what you read. (The sign for multiplication and the sign for division have not yet been given.)

Who has an example for what I have expressed on the board?

$6 + 4 = 10.$	$9 \text{ divided by } 3 = 3.$
$5 + 3 = 8.$	$8 \text{ divided by } 2 = 4.$
$7 + 3 = 10.$	$10 \text{ divided by } 5 = 2.$
$5 + 4 = 9.$	$10 \text{ divided by } 2 = 5.$
$9 - 6 = 3.$	$2 \text{ fives} = 10.$
$10 - 4 = 6.$	$5 \text{ twos} = 10.$
$10 - 7 = 3.$	$10 \text{ zeros} = 0.$
$10 - 6 = 4.$	$\frac{1}{2} \text{ of } 10 = 5.$
$10 - 3 = 7.$	$\frac{1}{3} \text{ of } 9 = 3.$
$10 - 8 = 2.$	$\frac{1}{4} \text{ of } 8 = 2.$
$10 - 0 = 10.$	$\frac{1}{8} \text{ of } 8 = 1.$

Use the proper signs where I have omitted them:

6	4	10.	10	7	3.
10	6	4.	10	0	10.
10	4	6.	10	10	0.
4	6	10.	10	3	7.

CHAPTER XI.

THE NUMBER ELEVEN.

§ 33. THE NUMBER ELEVEN.

Take ten splints. Make them into a little bundle, and put an elastic band about them. Take one more splint. How many splints have you in the bundle? How many splints besides? Tell me what you have. (Ten and one.) Who knows how many splints ten splints and one splint are?

Put back your eleven splints. Take eleven again the quickest way you can. (One ten and one.)

How many in the bundle? how many besides? One ten and one are how many? Write in words: One ten and one are eleven.

Who can express the number eleven in figures?

Who knows what the two ones mean?

Show me the *one* that stands for one ten. The *one* that stands for one.

Take nine blocks. Take two more blocks. How many blocks have you? Who has an example for nine and two?

I have three three-cent pieces, and a two-cent piece of money. How much money have I?

If I bought three three-cent stamps and a two-cent stamp, how much money did I spend?

If you buy three three-cent pencils and one two-cent pencil, how much money must you give for them?

If you have two cents, and earn nine more cents, how many cents will you then have?

There are two blossoms and nine buds on our night-blooming plant. How many buds and blossoms are on the plant?

There are two peach trees and nine pear trees in our garden. How many trees are in the garden? If the two peach trees die, how many trees will remain?

If you put back two of the eleven blocks you have shown me, how many blocks will you show me?

Represent eleven trees on the board, two of them lying on the ground. How many are standing?

Represent eleven chimneys. Two have no smoke coming out of them; the rest have. From how many chimneys is the smoke coming?

Represent eleven frogs, two on the edge of the pond, and the others in the pond. How many are in the pond?

Illustrate these stories:

Eleven blackbirds were flying in the air, but nine alighted on the ground.

Eleven clay balls were drying in the sun. Nine cracked in drying.

Eleven lamp-posts are on the street. Only nine have lamps on them.

I have eleven lead-pencils. Nine of them are sharpened, and the rest are not.

Eleven umbrellas stood in a shop window. Nine were shut and the rest were open.

Write on the board:

Nine and two are eleven.

Two and nine are eleven.

Eleven minus two are nine.

Eleven minus nine are two.

Ten and one are eleven.

Complete these expressions :

$9 + 2 =$	$10 \quad 1 \quad 11.$
$11 - 2 =$	$11 - \quad = 10.$
$2 + 9 =$	$11 \quad 0 \quad 11.$
$11 - 9 =$	$11 - \quad = 9.$
$11 - 10 =$	$11 \text{ ones} =$
$11 \text{ zeros} =$	$11 \text{ divided by } 1 =$
$9 + \quad = 11.$	$9 \quad 2 \quad 11.$
$11 - \quad = 9.$	$11 \quad 2 \quad 9.$
$2 + \quad = 11.$	$2 \quad 9 \quad 11.$
$11 - \quad = 2.$	$11 \quad 9 \quad 2.$

There were eight tin pans and three milk-pails on a bench drying in the sun. Show me, with the splints, how many things were on the bench.

Eight hens and three worms are how many things?

Eight men and three boys are how many persons?

Eight chickens and three ducks are how many fowls?

Eight sky-rockets and three flying pigs are how many pieces of fireworks?

Tell me about eight bunches of grapes and three bunches of grapes; eight pears and three pears; eight great apples you saw at the fair and three small apples; eight red balloons and three blue balloons.

If you spent four two-cent pieces and a three-cent piece for molasses candy, how much did you spend?

How many legs have two dogs, and a stool with three legs?

If a blacksmith shoes two horses entirely round, and puts three shoes on another horse, how many shoes does he use?

If I have four pairs of shoes, and three odd shoes, how many shoes have I?

I have a five-cent piece of money, a three-cent piece, and three one-cent pieces. How much money have I?

There are three boys and eight girls in the first class, and eight boys and three girls in the second class. Which is the larger class?

Mr. Brown has eight cows and three horses. Mr. Smith has three cows and eight horses. Which has the more animals?

Which costs the more: some candy for three cents and a pencil for eight cents, or some candy for eight cents and a pencil for three cents?

If I have four two-cent pieces of money and a three-cent piece, and spend the three-cent piece, how much money shall I have left?

If eleven dor-bugs should come in at my window, and three should alight on my table, how many more dor-bugs would still be flying about the room?

If eleven ants were carrying away a great beetle, and three got tired and ran away, how many ants were left to carry the beetle?

If eleven flies were sipping at a drop of molasses, and three flew away, how many flies were there sipping at the molasses?

Make some drawing on the board to show me that eleven minus three are eight.

Does any one know what eleven minus *eight* are?

Who has a story for eleven minus eight?

If eleven nuts minus eight nuts leave three nuts, what will be left if three nuts are taken from eleven nuts?

If eleven blocks minus three blocks leave eight blocks, what number will eleven minus eight leave?

Write: Eight and three are eleven.

 Eleven minus three are eight.

 Eleven minus eight are three.

Complete these expressions :

$11 - 3 =$	11	3	8.
$8 + 3 =$	8	3	11.
$11 - 8 =$	11	8	3.
$3 + 8 =$	3	8	11.
$9 + 2 =$	9	2	11.
$11 - 2 =$	11	2	9.
$2 + 9 =$	2	9	11.
$11 - 9 =$	11	9	2.
$11 - \quad = 8.$	$9 +$	$=$	11.
$8 + \quad = 11.$	$11 -$	$=$	9.
$11 - \quad = 3.$	$2 +$	$=$	11.
$3 + \quad = 11.$	$11 -$	$=$	2.

Nellie, stand seven spools in a row. Put four more spools with them. How many spools are now in the row?

Frank, set out seven tin plates; set out four more. How many tin plates have you set out altogether?

Seven horses and four sheep are how many animals?

A pound of flour at seven cents, and a pound of meal at four cents, will cost how much?

The cook made seven loaves of bread and four loaves of cake. How many loaves of bread and cake together did she make?

A week and four days are how many days?

A five-cent piece, a two-cent piece, and four cents are how many cents?

During three weeks, Annie went to school one whole week, two days another week, and four days the other week. How many days did she go to school during the three weeks?

If seven and four are eleven, four and seven are how many?

Which are more chickens: seven black chickens and four white ones, or four black chickens and seven white ones? seven gray rabbits and four white rabbits, or four gray rabbits and seven white ones? seven blue ribbons and four red ribbons, or four blue ribbons and seven red ones?

Who has a story for seven and four, or for four and seven?

If seven and four are eleven, who thinks how many eleven minus four will leave? See if you are right.

Eleven chairs minus four chairs are how many chairs?

Eleven oranges minus four oranges are how many oranges?

Eleven cents minus two two-cent pieces are how many cents?

Eleven days minus four days will leave what part of a week?

Eleven weeks minus a month will leave how many weeks?

Eleven months minus four months will leave how many months?

Eleven gills of milk minus a pint of milk will leave how many gills of milk? how many pints of milk?

If eleven blocks minus four blocks leave seven blocks, who thinks how many blocks would remain if I took *seven* blocks from eleven blocks. See if you are right. Who has an example for eleven minus seven?

There are eleven more days in this month. How many days over a week are there left in the month?

If there are eleven gills of water in this pail, and I dip out seven gills of water, what part of a pint will remain in the pail?

If I owe you eleven cents, and pay you seven cents, then give you the rest in two-cent pieces, how many two-cent pieces shall I give you?

Express : Seven and four are eleven.
 Four and seven are eleven.
 Eleven minus four are seven.
 Eleven minus seven are four.

Fill out these expressions :

$7 + 4 =$	$7 \quad 4 \quad 11.$
$11 - 7 =$	$11 \quad 7 \quad 4.$
$11 - 4 =$	$11 \quad 4 \quad 7.$
$4 + 7 =$	$4 \quad 7 \quad 11.$
$11 - 8 =$	$11 \quad 8 \quad 3.$
$3 + 8 =$	$3 \quad 8 \quad 11.$
$11 - 3 =$	$11 \quad 3 \quad 8.$
$8 + 3 =$	$8 \quad 3 \quad 11.$
$9 + 2 =$	$9 \quad 2 \quad 11.$
$11 - 2 =$	$11 \quad 2 \quad 9.$
$11 - 9 =$	$11 \quad 9 \quad 2.$
$2 + 9 =$	$2 \quad 9 \quad 11.$
$7 + \quad = 11.$	$11 - \quad = 4.$
$8 + \quad = 11.$	$11 - \quad = 3.$
$9 + \quad = 11.$	$11 - \quad = 2.$
$4 + \quad = 11.$	$11 - \quad = 9.$
$3 + \quad = 11.$	$11 - \quad = 8.$
$2 + \quad = 11.$	$11 - \quad = 7.$

Draw six lines up and down, and five lines from right to left. How many lines have you drawn?

Draw six pans right side up, and five bottom side up. How many pans have you drawn?

Draw six flower-pots with saucers, and five without saucers. How many flower-pots have you drawn?

Draw six hassocks and five crickets. How many foot-stools have you drawn?

Show me six sticks of one color, and five sticks of another color. How many sticks have you shown me?

Two three-cent pieces of money and a five-cent piece are how many cents?

Three two-cent pieces of money and a five-cent piece are how much money?

Who has seen six clothes-pins and five handkerchiefs on the line?

How many things were on the line?

Tell me a story for six and five.

If six and five are eleven, how many are five and six?

Tell me a story for five and six.

If you have six peanuts and five chestnuts, how many nuts have you?

If you eat the five chestnuts, how many nuts will you have?

If you have eleven walnuts, and eat five of them, how many nuts have you left?

If you have eleven cents, and one of the pieces of money is a five-cent piece, and the rest is in cents, how many cent-pieces have you?

If there are eleven beautiful great soap-bubbles floating in the air, and five burst, how many remain? If six had burst, how many would have remained?

I can buy a knife for eleven cents. If I pay for it with a five-cent piece and one-cent pieces of money, how many one-cent pieces do I pay out? If I paid for it with two three-cent pieces and one-cent pieces, how many one-cent pieces did I pay out?

In the school-yard are eleven shade trees. Six are poplar trees, and the rest are elm, maple, and butternut. How many are not poplars?

I bought eleven yards of black lace. I put three yards on each of two parasols. How many yards had I left?

Express : Six and five are eleven.
 Five and six are eleven.
 Eleven minus five are six.
 Eleven minus six are five.

Fill out these expressions :

$11 - 5 =$	11	5	6
$6 + 5 =$	6	5	11.
$11 - 6 =$	11	6	5.
$5 + 6 =$	5	6	11.
$11 - 4 =$	11	4	7.
$7 + 4 =$	7	4	11.
$11 - 7 =$	11	7	4.
$4 + 7 =$	4	7	11.
$11 - 3 =$	11	3	8.
$8 + 3 =$	8	3	11.
$11 - 8 =$	11	8	3.
$3 + 8 =$	3	8	11.
$11 - 2 =$	11	2	9.
$9 + 2 =$	9	2	11.
$11 - 9 =$	11	9	2.
$2 + 9 =$	2	9	11.
$6 + \quad = 11.$	$11 -$	$=$	9.
$7 + \quad = 11.$	$11 -$	$=$	8.
$8 + \quad = 11.$	$11 -$	$=$	7.
$9 + \quad = 11.$	$11 -$	$=$	6.
$11 + \quad = 11.$	$11 -$	$=$	5.
$11 - \quad = 4.$	$11 -$	$=$	3.
$11 - \quad = 2.$	$11 -$	$=$	0.
$11 + \quad = 11.$	$11 -$	$=$	11.

Exercise for Review.

Two squares and a triangle have how many sides?
 Two triangles and a square have how many sides?

Three triangles have how many sides?

Two squares have how many corners?

A square and a triangle have how many corners?

Two triangles have how many corners?

Eleven geese have how many bills?

I saw five oxen with a ball on each horn. How many balls did it take for all the oxen?

My lamp has two shades, a glass shade and a porcelain shade. How many shades will it take for five such lamps?

Five rocking-chairs have how many rockers?

A cabinet-maker made two chests, with five drawers in each chest. How many drawers did he make for both chests?

How many school-days are there in two weeks?

An extension table has five legs. How many legs have two extension tables?

How many leaves has one sheet of paper? How many leaves have five sheets of paper?

Five sheets of paper and a half sheet are how many half sheets of paper?

A week and four days are how many days?

A month and seven weeks are how many weeks?

Two pints and three gills are how many gills?

How many legs and wings, together, has a butterfly?

A week and three days are how many days?

Two months and a half are how many weeks?

Two pints and a half are how many gills?

This line is ten inches long. How long is half the line?

It is ten miles to the Falls. How far is it half-way there?

I can buy slate-pencils at two for a cent. How many cents will ten slate-pencils cost?

How many five-cent stamps can I buy for ten cents? How many two-cent stamps? How many three-cent stamps? How many one-cent stamps?

If lemons are five cents apiece, how many can I buy for ten cents?

How many five-cent pieces does it take to equal ten cents?

I have eleven cents in two pieces of money. What must the pieces of money be?

I have eleven cents in three pieces of money. What may the three pieces of money be? What else may they be?

I have eleven cents in four pieces of money. What may the four pieces of money be? What else may they be? What else may they be?

Two three-cent pieces and a five-cent piece of money equal how many cents?

A five-sided figure and a six-sided figure have how many sides all together?

Eleven chickens have gone to roost. Six are roosting in a tree, and the rest on a fence. How many are roosting on the fence?

There are eleven children in my third class, but five of them got so tired at the Fair that they could not come to school to-day. How many are here?

How many one-cent pencils can you buy for eleven cents? How many two-cent pencils? How many three-cent pencils? How many four-cent pencils? How many five-cent bunches of envelopes? How many six-cent quires of paper? How many seven-cent books? How many eight-cent slates? How many bottles of ink at nine cents a bottle? How many ten-cent watches?

Tell me any two numbers that together make eleven.

Who has some question for the class to answer?

CHAPTER XII.

THE NUMBER TWELVE.

§ 34. THE NUMBER TWELVE.

Take ten splints. Put them together in a bundle, and put an elastic band about the bundle. Take two more splints. How many splints are in the bundle? How many splints have you besides? Who knows how many splints ten and two are?

Put back the twelve splints. Take twelve again the quickest way. What did you take? (One ten and two.)

Write in words: One ten and two are twelve.

Who can express the number twelve in figures?

How many figures do you use to express twelve? What are the figures? Which figure do you make first in writing twelve? Who thinks what the figure 1 stands for? What does the figure 2 stand for? One ten and two are how many?

Express the number eleven under twelve. Express the number ten in the same column. How many ones in twelve besides the one ten? Point to the figure that stands for the two ones. How many ones in eleven besides the one ten? Point to the figure that stands for the one. How many ones in ten besides the ten ones? Point to the figure that shows there are no ones.

If you have been to school two weeks and two days this term, how many days have you been to school?

If there are ten great yellow cucumbers cut into Jack-o-Lanterns, and two more waiting to be cut into Jack-o-Lanterns, how many cucumbers are there all together?

Rose is ten years old. Her brother is two years older. How old is her brother?

If there are ten boys playing Fox and Geese, and two more boys join them, how many boys are playing Fox and Geese?

There are ten rooms in our house besides the two attic rooms. How many rooms are there with the attic rooms?

Who will ask me a question about ten and two? Frank, ask Charley a question about ten and two. Nellie, ask Mary a question about ten and two.

Ten apple turnovers and two apple turnovers are how many?

Ten beautiful girl-dolls and two soldier-dolls are how many dolls?

If ten and two are twelve, two and ten are how many?

Two jugs and ten pitchers are how many things?

Two saucers and ten butter-plates are how many dishes?

Two knives and ten forks are how many things?

Two children in the middle of a ring, and ten in the ring make how many children?

If the two that are in the middle of the ring run away, how many will be left?

If twelve girls are playing Drop the Handkerchief, and two fall out of the ring, how many are left?

If twelve boys are playing King's Land, and two get caught, how many will be left to play?

There are twelve working days in two weeks. How many working days are there in two weeks minus two days?

Show me twelve splints. Take away ten splints, and tell me how many remain.

Tell me about twelve chimney swallows, and two came down the chimney into the room. About twelve eggs, and two were used for cake. About twelve months in the year, and you were away visiting two months in the year.

If you have twelve cents, and spend ten cents, how many cents will you have?

If I have twelve postal cards, and use ten, how many postal cards shall I have?

If I teach ten months in the year, how many months have I for vacation?

If I have twelve cents in two pieces of money, and one of the pieces of money is a ten-cent piece, what is the other piece of money?

There were ten cows and a pair of oxen feeding in a pasture. How many cattle were in the pasture?

There were twelve books lying on my table, and I put all but two on the book-case. How many did I put on the book-case?

It will take two yards of trimming for my dress, and ten yards of dress goods. How many yards of material must I buy for my dress?

There are twelve tacks in my screen, but two have lost their heads. How many are whole?

Stand twelve spools up for soldiers. Make them march by twos. How many twos are there in the twelve?

Call the spools gate posts. If it takes two for each gate, how many gates can you supply with posts?

Call these twelve sticks shafts for carriages. For how many carriages have you shafts? Call them curtain sticks. If it takes two for each curtain, how many curtains can you supply?

Call them sled runners. How many sleds can you supply with runners?

Tell me a story for twelve divided by two.

If there are six twos in twelve, how many twos make twelve?

Six boys have how many eyes? how many ears? how many shoulders? how many feet? how many arms?

Six jackets have how many sleeves?

Six pairs of trousers have how many legs?

Two flies have six times as many legs as a boy. How many legs have two flies?

Jennie is two years old, and Harry is six times as old. How old is Harry?

A small pail holds two quarts. The water-pail holds six times as much. How much does the water-pail hold?

I will give you another name for twelve. We call it a dozen.

A dozen eggs are how many eggs?

A dozen baskets of wood are how many baskets of wood?

A dozen fruit cans are how many cans?

A dozen persons are how many persons?

A dozen peaches are how many peaches?

Where have you heard the word dozen before?

Whenever you hear the word, of what number will you think?

How many pairs of boots in a dozen boots?

If you buy a dozen eggs, and use two eggs, how many eggs have you left?

If you use ten eggs, how many eggs have you left?

If the family eats a dozen tomatoes for dinner, how many tomatoes are eaten?

Express: Ten and two are twelve.

Twelve minus two are ten.

Twelve minus ten are two.

Two and ten are twelve.

Twelve divided by two are six.

Six twos are twelve.

Fill out these blanks :

$10 + 2 =$	10	2	12.
$12 - 2 =$	12	2	10.
$2 + 10 =$	2	10	12.
$12 - 10 =$	12	10	2.
$12 - \quad = 10.$	12 divided by 2 =		
$10 + \quad = 12.$	6 twos =		
$12 - \quad = 2.$	12 divided by $\quad = 6.$		
$2 + \quad = 12.$	6 $\quad = 12.$		

A farmer, in counting his eggs for the market, found he had ten dozen and nine more eggs. Who can find how many eggs he lacked of another dozen?

Nine eggs and three eggs are how many eggs?

If I have three three-cent pieces, and three one-cent pieces of money, how much money have I?

Annie had nine cents, and Nellie had a three-cent piece. How much money had both?

If you begin school at nine in the morning, and are in school three hours, what time is it when you are dismissed?

If Johnny falls asleep at nine o'clock, but wakes when the clock is striking twelve, how many hours has he been asleep?

I can start from the railroad station at nine in the morning, and get to Boston at noon. How many hours' ride is it to Boston?

James bought a dozen eggs at the store, but tipped three out of his basket on the way home. How many had he when he reached home?

We put up a dozen cans of peaches one fall, but gave away three cans. How many cans did we have for our own use?

I can buy little boxes of pens with a dozen pens in each box. If I use nine out of a box, how many will remain in the box?

I picked a dozen quarts of berries, and sold nine quarts. How many quarts did I keep for my own use?

There are a dozen panes of glass to be set in a window. When nine are set, how many more are to be set?

If I have a dozen pencils to sharpen, and sharpen nine of them, how many pencils shall I still have to sharpen?

I had a box of thread with a dozen spools in it, but have used nine spools. How many spools have I left?

Who can tell me about nine tops and three tops? nine houses and three barns? nine crows and three scare-crows? nine watermelons and three green pumpkins?

Draw three tops on the board; draw below them nine others. How many tops have you drawn?

Draw anything you choose to show that three and nine are twelve.

If I have nine peaches, how many more peaches must I have to make a dozen peaches? What then is the difference between nine and twelve?

If Susie finds a dozen pins, and Mary finds only nine, how many more pins does Susie find than Mary?

Some kinds of candy are nine cents a quarter, and other kinds are twelve cents a quarter. What is the difference in price?

Some lace is nine cents a yard, and other lace is twelve cents a yard. What is the difference in price?

If I have three sheets of paper, how many more sheets of paper must I have to make a dozen sheets of paper? What then is the difference between three and twelve?

Who knows how many threes there are in twelve? Twelve divided by three are how many?

How many boxes will it take for twelve dozen eggs if you pack three dozen eggs in each box?

I have twelve cents in three-cent pieces. How many three-cent pieces have I?

How many three-cent stamps can I buy for twelve cents? How many three-cent pencils? How many three-cent rubbers?

How many three-quart pails will it take to hold twelve quarts of cranberries?

Who will tell me a story about twelve divided by three?

Draw twelve bottles on the board, and put them in rows of three each. How many rows of bottles have you?

Four rows of bottles, with three in each row, are how many bottles?

If a dozen buttons are arranged on a card in rows of three each, how many rows of buttons are there?

Four rows of buttons, with three buttons in a row, are how many buttons?

Four velocipedes have how many wheels, if each velocipede has three wheels?

A tricycle has three wheels. How many wheels have four tricycles?

My little basket watch-stand has three legs. How many legs will four such watch-stands have?

Most pitchforks have three tines each. How many tines do four pitchforks have?

Four horse-cars, with three horses attached to each car, have how many horses?

Four houses, with three chimneys each, have how many chimneys?

Tell me a story for four threes.

Express: Nine and three are twelve.

Twelve minus three are nine.

Three and nine are twelve.

Twelve minus three are nine.

Twelve divided by three are four.

Four threes are twelve.

Finish these expressions:

$12 - 3 =$	12	3	9.
$9 + 3 =$	9	3	12.
$12 - 9 =$	12	9	3.
$3 + 9 =$	3	9	12.
$12 - 2 =$	12	2	10.
$12 - 10 =$	12	10	2.
$10 + 2 =$	10	2	12.
$2 + 10 =$	2	10	12.
6 twos =	12 divided by 2 =		
4 threes =	12 divided by 3 =		
$12 - \quad = 9.$	$9 + \quad = 12.$		
$12 - \quad = 3.$	$3 + \quad = 12.$		
$12 - \quad = 2.$	$2 + \quad = 12.$		
$12 - \quad = 10.$	$10 + \quad = 12.$		
$6 \quad = 12.$	$12 \quad 2 = 6.$		
$4 \quad = 12.$	$12 \quad 3 = 4.$		

If I cut a pie into four equal parts, what part of the pie is each piece? If I separate a number into four equal groups, what part of the number is each group?

You may separate twelve into four equal groups. What part of twelve is each group? Show me one-fourth of twelve. What is one-fourth of twelve?

If I have a dozen apples, and give you one-fourth of what I have, how many apples shall I give you?

If I have a dozen geranium blossoms, and one-fourth of them drop off, how many blossoms drop off?

If I use a quarter of a dozen eggs, how many eggs shall I use?

There are twelve months in a year. One-fourth of the year is how many months? Summer is one-fourth of the year. How long is Summer?

Winter is one-fourth of the year. How long is Winter? Each of our seasons is one-fourth of the year. How long is each season?

If I divide twelve chocolate mice equally among four little girls, how many chocolate mice shall I give to each?

I have a three-cent piece in my hand, which is one-fourth of all the money I have. How much money have I?

Ada spent three weeks in the country, which was one-fourth of her vacation. How long was her vacation?

John was absent from school a fourth of the term. He was absent three weeks. How long was the term?

A gentleman received three letters one day, which was only one-fourth of what he usually received. How many did he usually receive?

Who has a story for one-fourth of twelve?

Express this fact a dozen times on the board ($\frac{1}{4}$ of 12 is 3).

Here are some paper patterns. Each take eight of a kind. What have you taken, Bessie? (Butterflies.) Take four more butterflies. Harry? (Horses.) Take four more horses. Nellie? (Brooms.) Take four more brooms. John? (Shovels.) Take four more shovels. How many butterflies have you, Bessie? Eight butterflies and four butterflies are how many butterflies? How many horses have you, Harry? Eight horses and four horses are how many horses? How many brooms have you, Nellie? Eight brooms and four brooms are how many brooms? How many shovels have you, John? Eight shovels and four shovels are how many shovels?

Each write: Eight and four are twelve, a dozen times on the board.

Let the eight and four change places, and read the expression (Four and eight are twelve).

Who has an example for four and eight?

I agreed to dress a dozen paper dolls for the Fair. I have dressed eight dolls. How many more must I dress?

Eight and how many more are twelve? A wheel, then, that has only eight spokes needs how many more spokes to make twelve spokes?

I can buy a dozen sheets of tissue paper for eight cents. Silver paper costs a cent a sheet. How much more will a dozen sheets of silver paper cost than a dozen sheets of tissue paper?

When dates are eight cents a pound, and figs twelve cents a pound, what is the difference in price?

Express on the board the difference between twelve and eight.

Twelve is four more than what number?

Eight is four less than what number?

Twelve is eight more than what number?

Four is eight less than what number?

Draw on the board twelve pins, putting four pins in each row. How many rows have you?

A gardener has twelve plants which he is going to set out in clusters of four each. How many clusters can he make?

Here are twelve sticks of equal length. How many separate squares can you form with them?

Twelve horse-shoes will supply how many horses with shoes if they need shoeing all round?

Twelve dollars will pay for how many weeks' board, if you pay four dollars a week?

A ten-cent piece and a two-cent piece will buy how many oranges at four cents apiece?

Who can express this fact on the board? (12 divided by 4 = 3.)

Express it just as many times as there are fours in twelve?

Here are three horses. How many legs have they altogether?

Here are three table-forks, and each fork has four tines. How many tines have the three forks together?

Three chairs have how many legs?

Three squares have how many sides? have how many corners?

One sheet of note-paper has how many pages? Three sheets have how many pages?

If I embroider a flower in each corner of a square table-cover, how many flowers must I embroider in three such table-covers?

Three four-pound weights are equal to how many pound weights?

If I measure three pints of milk with a gill dipper, how many times must I fill the dipper?

Three four-wheeled carriages have how many wheels?

Express this fact on the board ($3 \text{ fours} = 12$).

You may divide twelve into three equal groups. What part of twelve is each group? Show me one-third of twelve. How many do you show me in one-third of twelve?

If snow is on the ground one-third of the year, how many months is snow on the ground?

Susie had a dozen paper dolls, but a third of them got torn. How many got torn?

A man who had a dozen balloons to sell, sold a third of them to one boy. How many did the boy buy?

A carriage-maker has just finished a dozen wheels. He will use a third of them for one carriage. How many wheels will he use for that carriage?

A cooper who has a dozen cask-hoops will use four on a cask. What part of the number of hoops he has will he use for one cask?

I have four cents, which is one-third enough money to buy a dozen sugar cookies. How much are the cookies a dozen?

I have four pencils. What part of a dozen pencils have I?

Four is what part of twelve?

One-third of twelve is how many?

Give me an example for one-third of twelve?

Write: One-third of twelve is four.

Eight and four are twelve.

Twelve minus eight are four.

Four and eight are twelve.

Twelve minus four are eight.

Twelve divided by four are three.

Three fours are twelve.

One-fourth of twelve is three.

Fill out these expressions:

$8 + 4 =$	8	4	12.
$12 - 4 =$	12	4	8.
$4 + 8 =$	4	8	12.
$12 - 8 =$	12	8	4.
$9 + 3 =$	9	3	12.
$12 - 3 =$	12	3	9.
$3 + 9 =$	3	9	12.
$12 - 9 =$	12	9	3.
$10 + 2 =$	10	2	12.
$12 - 10 =$	12	10	2.
$2 + 10 =$	2	10	12.
$12 - 2 =$	12	10	2.
6 twos =	4 +	= 12.	
4 threes =	8 +	= 12.	
3 fours =	9 +	= 12.	
$\frac{1}{4}$ of 12 is	10 +	= 12.	
$\frac{1}{8}$ of 12 is	3 +	= 12.	
12 divided by 2 =	2 +	= 12.	
12 divided by 3 =	12 -	= 8.	
12 divided by 4 =	12 -	= 4.	

If Ned has eight cents, and Harry four cents, how many cents have both? If Ned pays Harry a cent, how many cents will both have? How many cents will *each* have? Seven cents and five cents are how many cents?

Give examples for seven and five.

If I have seven peaches, how many more peaches must I have to make a dozen peaches?

If I lack five of a dozen, how many have I?

Seven candle-sticks were on the table a moment ago. Now there are twelve. How many have been added to the number that was there first?

A dozen turkeys went off in the wet grass one morning, and only seven came back. How many were missing?

Twelve milk-cans were drying on a bench, but the wind blew seven off on the ground. How many cans were left on the bench?

John had but five cents this morning. Now he has twelve cents. How many cents has he earned through the day?

Express on the board the difference between twelve and seven.

Express on the board the sum of seven and five.

Express the difference between twelve and five.

Ben had seven nuts, George had five nuts. How many nuts had they together? Ben gave one of his nuts to George. How many had both then? How many had *each*? Six nuts and six nuts are how many nuts?

Give me stories for six and six.

Twelve is how many more than six?

Six and how many more are twelve?

If there are a dozen books in one pile, and six in another pile, how many more books are in one pile than in the other?

If I have a dozen beautiful colored leaves, and you have only six leaves, how many more have I than you?

I have six beautiful butterflies that were given me by a little boy. He says he is going to give me a dozen. How many more will he need to give me?

Express on the board the sum of six and six.

Express the difference of twelve and six.

If six and six are twelve, how many sixes are there in twelve?

Divide twelve by six, and see if two is the answer.

Twelve apples will make how many puddings if six apples are required for each pudding?

Twelve yards of dress goods will make how many dresses if six yards are required for each dress?

Who has a story for twelve divided by six?

If there are two sixes in twelve, how many sixes make twelve?

Two window sashes, with six panes of glass in each sash, contain how many panes of glass?

Two cubes have how many faces?

How much will two six-cent books cost?

How much will two lamps cost at six dollars apiece?

I sent two books through the mail. One weighed six ounces, and the other weighed twice as much. How many ounces did the heavier book weigh?

What two equal numbers make twelve?

What then is one-half of twelve?

What distance is one-half of twelve miles?

How many eggs in a half-dozen eggs?

How many months in half a year?

This rule is twelve inches long. How long is half the rule?

If twelve persons can sit on two settees, how many persons can sit on one settee?

It takes twelve hours for the short hand to go round the face of the clock. How many hours will it take the hand to go half-way round?

If a gentleman gets twelve letters in a single mail, and answers half of them immediately, how many does he answer at once?

Tell me a story for one-half of twelve?

Express on the board :

The sum of six and six.

The difference of twelve and six.

One-half of twelve.

Twelve divided by six.

The number of sixes that make twelve.

Fill out these expressions :

$\frac{1}{2}$ of 12 =	6 +	= 12.
$\frac{1}{3}$ of 12 =	7 +	= 12.
$\frac{1}{4}$ of 12 =	8 +	= 12.
6 twos =	9 +	= 12.
4 threes =	10 +	= 12.
3 fours =	12 -	= 6.
2 sixes =	12 -	= 0.
12 - 2 =	12 -	= 7.
12 - 3 =	12 -	= 1.
12 - 4 =	12 -	= 8.
12 - 5 =	12 -	= 2.
12 - 6 =	12 -	= 9.
12 - 12 =	12 -	= 3.
12 - 11 =	12 -	= 10.
12 - 10 =	12 -	= 4.
12 - 9 =	12 -	= 5.
12 - 8 =	12 -	= 11.

The Sign \times .

Read these expressions:

2 twos = 4.	• 2 sixes = 12.
2 threes = 6.	3 fours = 12.
3 threes = 9.	2 fives = 10.
3 twos = 6.	5 twos = 10.
2 fours = 8.	4 threes = 12.
4 twos = 8.	6 twos = 12.

(At each correct reading introduce the sign of multiplication together with the required figure. The expressions will then stand:

$2 \times 2 = 4.$	$2 \times 6 = 12.$
$2 \times 3 = 6.$	$3 \times 4 = 12.$
$3 \times 3 = 9.$	$2 \times 5 = 10.$
$3 \times 2 = 6.$	$5 \times 2 = 10.$
$2 \times 4 = 8.$	$4 \times 3 = 12.$
$4 \times 2 = 8.$	$6 \times 2 = 12.)$

Read these expressions:

Two twos are four.
Two sixes are twelve.
Five ones are five.
Seven ones are seven.

Write in this new way:

Eight zeros are zero.
Eleven ones are eleven.
Twelve ones are twelve.
Six twos are twelve.

Complete: $2 \times 2 =$

$3 \times 2 =$	2	$6 = 12.$
$4 \times 2 =$	2	$5 = 10.$
$5 \times 2 =$	3	$4 = 12.$
$6 \times 2 =$	4	$3 = 12.$
$2 \times 3 =$	6	$2 = 12.$
$3 \times 3 =$	2	$4 = 8.$
$4 \times 3 =$	4	$2 = 8.$
$2 \times 4 =$	2	$3 = 6.$
$3 \times 4 =$	3	$2 = 6.$
$2 \times 5 =$	3	$3 = 9.$
$2 \times 6 =$	5	$2 = 10.$
	2	$2 = 4.$

The Foot.

You may each take one of these strips of paper. Who knows how long the strip of paper is? It is a foot long.

Draw a line on the board a foot long; draw another line just as long extending in some other direction. How long is it?

Measure off a foot on the edge of the table; on the edge of the platform; on the edge of the blind; on the edge of the blackboard; on the round of the chair; on the round of the settee; on the leg of the chair; on the leg of the settee; on the desk; on the piano; on your slate if you can. Whose slate has a side a foot long? Extend your arms with your hands a foot apart. I will measure the distance between your hands.

Lay off on your arm the distance of a foot. I will see if my foot-measure will just fit the distance.

What have you seen at home that is a foot in length? Who has seen any one measure with a foot-rule before to-day?

This foot-rule is marked off into short distances. How long is each distance? (An inch.) How many inches long is this foot-rule? How many inches long is the line you drew? How many inches apart are your hands if you hold them a foot apart? How many inches is your step if it is a foot long? If you stand a foot apart from each other, how many inches apart are you?

Tell me a story for twelve inches in a foot.

How many inches in half a foot?

If you draw a square a half a foot on each side, how many inches long is a side of the square?

In one-fourth of a foot how many inches? Which is longer, one-half of a foot or one-fourth of a foot? How many quarters of a foot does it take to make a half a foot?

How many inches in one-third of a foot? Which is more, one-half, one-third, or one-fourth of a foot? Which is more, one-third or one-fourth of a foot?

Write on the board what you have found out about the number of inches in a foot, as I have written it (12 inches = 1 foot). Write the expression a half dozen times.

Exercise for Review.

Six books have how many covers?

Six sheets of note-paper have how many leaves?

Six pairs of scissors have how many blades?

Let this circle represent a wheel. Let these eight lines represent spokes. How many more spokes does it need to have twelve spokes?

There are twelve panes of glass in each of my windows. The panes are arranged in rows of three each. How many rows in each window?

I can make a pretty design by drawing four maple leaves. If I make three such designs, how many maple leaves shall I draw?

Nellie is putting a border on the board in squares. She puts two leaves in each square. How many leaves will she put in five squares? in six squares?

Annie is drawing a border in circles. She will put six leaves in each circle. How many leaves will she put in two circles?

Cyrus has just finished the twelfth leaf of his writing-book, and is half way through the book. How many more leaves has he to write? If he writes three leaves a week, how many weeks will be required to finish the book? What part of a month? What part of the term if there are twelve weeks in a term?

I have a silver vase with three cups. How many cups have four such vases?

How many handles have six trunks if three of them have lost a handle each?

Three squares have how many sides?

Four triangles have how many sides?

Six cylinders have how many plane faces?

Two cubes have how many faces?

A foot-rule is how many inches in length? One-half a foot is how many inches? One-fourth of a foot? One-third of a foot?

Six clothes-pins have how many legs?

How many heads have eleven clothes-pins?

How many eyes have eleven buttons?

A half dozen boys were watching a monkey dance, and five more came to see the fun. How many boys were watching the monkey then?

The Wide Awake comes once a month. I have the numbers for half a year, and for five more months. How many numbers have I?

If two books come each month, how many shall I get in five months and a half?

If two come each month, how often do they come by the week? How many shall I have received in twelve weeks?

I have read of a giant that was seven feet tall. A room in your house is ten feet high. How much difference is there between the height of your room and this giant?

A lady brought home six monkeys and five parrots as pets. She tied the monkeys to the fence, and hung the parrot cages on a tree near the fence. How many pets could the children count as they stopped to watch them?

There were seven visiting cards in my card-receiver this morning. Now there are eleven. How many callers have I had during the day if each brought a card?

There are eight tones in the musical scale. If you can sing the scale and three more tones, how many tones can you sing?

If there are three ripe pumpkins, and eight green pumpkins in the field, how many pumpkins are in the field?

If you are to go away from home the eleventh of the month, and it is now the eighth of the month, how many days have you at home counting to-day?

From the third of the month to the eleventh of the month are how many days counting the third?

Neddie and Harry were counting the rails in a fence. Neddie counted by ones, and Harry counted by twos. Who counted them quickest? How could you count them quicker still?

If you count twelve by ones, how many numbers must you name over to yourself? If you count twelve by twos, how many numbers will you name over to yourself? If you count twelve by threes, how many numbers will you name?

You may go about the room and make believe you are out of doors. When you come back I shall ask you what you saw, how many you saw, and how you counted them. What did you see, Ellen? (Trees in an orchard.) How many? (Twelve.) How did you count them? (By threes.) Let me hear you count twelve by threes. What did you see, Grace? (Doves in the path.) How many? (Ten.) How did you count them? (By twos.) Count ten by twos. What did you see, Henry? (Cows in the pasture.) How many? (Nine.) How did you count them? (By threes.) Count nine by threes. What did you see, Willie? (Butterflies.) How many? (Seven.) How did you count them? (By ones.) Why did you count them by ones? (Because they were all flying about.)

You may form a circle. George may stand in the centre and remain until he fails to tell me how many :

Four and three?	Six and three?
Eight and three?	Seven and three?
Nine and three?	Five and three?
Five and four?	Seven and four?
Six and four?	Eight and four?
Seven and five?	Six and five?
Six and six?	Two sixes?
Two fives?	Two threes?
Two fours?	Three threes?
Three twos?	Three fours?

Each take twelve blocks. Call them chickens. Close your eyes. (Teacher removes a number from each group.) Open your eyes and tell me about your loss.

Mary. I had twelve chickens; now I have but eight. I have lost four.

Willie. I had twelve chickens; now I have but six. I have lost six.

Nettie. I had twelve chickens and have lost five, so I have but seven chickens.

How many have you lost, Harry? (Three.) Mamie? (Two.) Bertie? (Eight.) Susie? (Nine.)

Each take five blocks. Call them cents. Close your eyes again. (Teacher adds a number to each group.) Open your eyes and tell me what you have gained.

Annie. I had five cents; now I have eight cents. I have gained three cents.

Helen. I had five cents; now I have ten cents. I have gained five cents.

How many have you gained, John? (Six.) Lizzie? (Four.) James? (Two.) Ned? (Five.) Ralph? (Seven.) Henry? (Three.) George? (Eight.)

CHAPTER XIII.

THE NUMBER THIRTEEN.

§ 35. THE NUMBER THIRTEEN.

Take ten splints. Put them into a bundle, and put this band about them.

Take three more splints. How many are in the bundle? How many more have you? Who knows how many each has all together? Thirteen is the right number. Put the splints back. Take thirteen the quickest way. (One ten and three.) What did you take? (One ten and three.) One ten and three are how many? Write this in words on the board. (One ten and three are thirteen.)

Show me the number of tens in thirteen. (Let teacher put the figure 1 over the phrase "one ten.") Show me how many ones besides. (Let the figure 3 be placed over the word three.) Who can express thirteen in figures? Show me the figure that stands for the number of tens; for the number of ones besides. Express twelve below thirteen. Express eleven in the same column. Express ten. How many tens in each of these numbers? How many tens all together? How many ones all together?

Ralph brought me ten cents for a book, and three cents for a pencil. How many cents did he bring me?

Ten crackers and three crackers are said to be a baker's dozen. How many make a baker's dozen?

If there are ten Japanese lanterns on a tree, and I hang three more on the tree, how many Japanese lanterns are then on the tree?

If there are thirteen Japanese lanterns in a tree, and three burn out, how many will remain in the tree?

If there are thirteen persons in our family, and three go away, how many persons will remain in our family?

If there are thirteen sticks of wood in the basket, and I put three in the fire, how many will remain in the basket?

If three must be added to ten to give thirteen, what number must be taken from thirteen to leave ten? Since thirteen minus three equals ten, thirteen minus ten will equal what number?

What is the difference between thirteen and ten? between thirteen and three?

If one kind of syrup is ten cents a quart, and another kind is thirteen cents a quart, what is the difference in price?

Mabel is three years old, and John is thirteen years old. What is the difference in their ages?

Express on the board the sum of ten and three.

$$(10 + 3 = 13.)$$

Express the difference of thirteen and three.

$$(13 - 3 = 10.)$$

Express the difference of thirteen and ten.

$$(13 - 10 = 3.)$$

I wish for a story for what you have expressed on the board.

If there were ten boys standing in one group, and three boys in another group, how many boys were there in both groups? If one of the ten boys should join the other group, how many would there be in both groups? How many in each group? Nine boys and four boys are how many boys?

Nine hours of work and four hours of work are how many hours of work?

Who has a story for nine and four?

What number must be put with nine to give thirteen?
Then four subtracted from thirteen will give what number?

There were thirteen swallows' nests in a sand-bank, but the bank gave way and destroyed four nests. How many were left?

I had a ten-cent piece and a three-cent piece of money. I spent four cents. How many cents did I have then?

If you have two five-cent pieces of money, and a three-cent piece, and spend the three-cent piece and one more cent, how many cents will you have?

Nine and what number are thirteen?

What number subtracted from thirteen leaves nine?

Since thirteen minus four leaves nine, thirteen minus nine will leave what number?

Tell a story for thirteen minus nine.

Express on the board the sum of nine and four.

Express the difference of thirteen and four.

Express the difference of thirteen and nine.

Tell me what to put in these blanks:

$10 + 3 =$	10	3	13.
$9 + 4 =$	9	4	13.
$13 - 3 =$	13	3	10.
$13 - 4 =$	13	4	9.
$13 - 10 =$	13	10	3.
$13 - 9 =$	13	9	4.

A squirrel has four toes on each forefoot, and five toes on each hind foot. How many toes has he on both forefeet and one hindfoot?

Two tables with each four legs, and one table with five legs, have how many legs all together?

Four two-cent stamps and a five-cent stamp cost how much?

A bench that is eight feet long and five feet wide measures how many feet on one side and one end together?

Eight and five equal what number?

Eight and what number equal thirteen?

Eight is how many less than thirteen?

If there are thirteen matches in a card, and I use five, how many will be left?

If to-day is the thirteenth of the month, how many days ago was the eighth of the month?

If this room is thirteen feet in width, how much wider is it than a small room that is only eight feet wide?

A room is thirteen feet wide, and eight feet high. What is the difference in width and height?

Give me a story for what I express:

$$8 + 5 = 13.$$

$$13 - 8 = 5.$$

$$5 + 8 = 13.$$

$$13 \times 1 = 13.$$

$$13 - 5 = 8.$$

$$12 + 1 = 13.$$

$$13 - 1 = 12.$$

$$11 + 2 = 13.$$

Henry had eight cents, and John had five cents. How many cents had both? Henry paid John one cent. How many cents had each of the boys then? How many cents had they together? What new pair of numbers have you just found make thirteen?

Tell me a story for seven and six.

A square and a triangle and a six-sided figure have how many sides?

How many weeks and days in thirteen days?

George had thirteen cents. If he had two three-cent pieces, and the rest of his money in one-cent pieces, how many one-cent pieces of money had he?

There are thirteen children in one division, and six of the children are girls. How many boys are in the division?

Of thirteen sheep in a flock, six were sold. How many were left of the flock?

There are thirteen pegs on a hat-rack. Six are covered with hats. How many can be seen?

Complete these expressions:

$6 + 7 =$	$6 +$	$= 13.$
$13 - 6 =$	$13 -$	$= 6.$
$13 - 7 =$	$13 -$	$= 7.$
$7 + 6 =$	$7 +$	$= 13.$
$8 + 5 =$	$8 +$	$= 13.$
$13 - 5 =$	$13 -$	$= 8.$
$13 - 8 =$	$13 -$	$= 5.$
$5 + 8 =$	$5 +$	$= 13.$
$9 + 4 =$	$9 +$	$= 13.$
$13 - 4 =$	$13 -$	$= 9.$
$13 - 9 =$	$13 -$	$= 4.$
$4 + 9 =$	$4 +$	$= 13.$
$10 + 3 =$	$10 +$	$= 13.$
$13 - 10 =$	$13 -$	$= 3.$
$13 - 3 =$	$13 -$	$= 10.$

CHAPTER XIV.

THE NUMBER FOURTEEN.

§ 36. THE NUMBER FOURTEEN.

Take a bundle of ten splints. Take four more splints. How many splints have you taken in all? Show me what makes fourteen. Tell me what makes fourteen. Write it in words on the board. (One ten and four are fourteen.)

Who will express fourteen in figures?

Which figure shows the number of tens in fourteen? Which figure shows the number of ones that must be put with ten to give fourteen?

Express thirteen just below fourteen. Express twelve in the same column; eleven; ten. How many tens in fourteen? in thirteen? in twelve? in eleven? in ten? Point to the column of tens.

What must be put with ten to give fourteen? to give thirteen? to give twelve? to give eleven? to give ten? Point to the column of ones.

A ten-cent piece of money, and two two-cent pieces of money, are how much money?

If there are ten buttons on a string, and I put four more buttons on the string, how many buttons will then be on the string?

I wish to place my boys in rows with fourteen in each row. After placing them I find I have only four boys for the last row. How many more do I need to have the row filled?

A room is fourteen feet wide. How many feet will a ten-foot pole lack of reaching across the room?

There were fourteen rails along the balustrade, but four got broken. How many rails were then along the balustrade?

Some boys who went for berries took with them a fourteen-quart pail. They picked ten quarts of berries. How many more quarts would their pail hold?

I have ten pictures in my album, and it will hold four more pictures. How many pictures will my album hold?

Take fourteen. How many tens have you? How many ones besides? How many twos in ten? How many twos in four? How many twos in ten and in four together? How many twos in fourteen?

If I sell fourteen pencils in one morning, and sell two to each child, to how many children shall I sell the pencils?

If you have fourteen cents in two-cent pieces, how many two-cent pieces have you?

If a gem-pan has fourteen cups, two in each row, how many rows of cups has it?

If the blackboard is fourteen feet long, how many two-foot rules could be placed along its edge?

If a room is fourteen feet long, how many chairs, each two feet in width, can be placed along the side of the room?

If fourteen pounds of butter are put into lumps which weigh two pounds each, how many lumps of butter can be made from the fourteen pounds?

Who has examples for fourteen divided by two?

Express this fact a half dozen times on the board.

$$(14 \text{ divided by } 2 = 7.)$$

If each chestnut-burr has two nuts in it, how many burrs must you find to get fourteen nuts? Seven chestnut-burrs then, with two nuts in each burr, will have how many chestnuts?

Seven boys will wear how many shoes?

Seven pairs of skates are how many skates?

Seven yoke of oxen are how many oxen?

Seven spans of horses are how many horses?

I have two cents. How many cents must you have to have seven times as many cents as I have?

Ada is two years old. Jennie's age is seven times Ada's age. How old is Jennie?

If we eat two pounds of butter a day on the table, how many pounds shall we eat in a week?

If I write two letters a day, how many letters shall I write in a week?

Fill out:

$10 + 4 =$	10	4	14.
$14 - 4 =$	14	4	10.
$14 - 10 =$	14	10	4.
$4 + 10 =$	4	10	14.
$7 \times 2 =$	7	2	14.
$6 \times 2 =$	14 divided by 2 =		
$5 \times 2 =$	12 divided by 2 =		
$4 \times 2 =$	10 divided by 2 =		
$3 \times 2 =$	8 divided by 2 =		
$2 \times 2 =$	6 divided by 2 =		

The Sign \div .

Who knows what words are omitted in these expressions:

6	$2 = 3.$	12	$2 = 6.$
8	$4 = 2.$	12	$3 = 4.$
9	$3 = 3.$	12	$4 = 3.$
8	$2 = 4.$	12	$6 = 2.$
14	$2 = 7.$	12	$12 = 1.$

(Let the teacher introduce the sign of division as the correct phrase is given in each case. Have the expressions in their new form read.)

Read these expressions :

$2 \div 1 = 2.$	$14 \div 2 = 7.$
$7 \div 1 = 7.$	$14 \div 14 = 1.$
$14 \div 1 = 14.$	$14 \div 2 = 7.$
$12 \div 1 = 12.$	$12 \div 6 = 2.$
$13 \div 1 = 13.$	$12 \div 2 = 6.$
$12 \div 3 = 4.$	$12 \div 4 = 3.$

Write in the new way :

Eight divided by two are four.
 Ten divided by two are five.
 Twelve divided by two are six.
 Fourteen divided by two are seven.
 Eight divided by four are two.
 Ten divided by five are two.
 Twelve divided by six are two.
 Nine divided by three are three.
 Twelve divided by three are four.
 Twelve divided by four are three.

Take fourteen. If you take one from the bundle of tens and put it with four, what two numbers will you show me?

Nine and five are how many?

Tell me a story for nine and five.

It is nine hours since I got up this morning. If I sit up five hours longer, how many hours will there be in my day?

A room in our cottage is nine feet high. The church is five feet higher. How high is the church?

If I have three three-cent pieces, and a five-cent piece of money, how much money have I?

Annie bought three peaches at three cents apiece, and five one-cent rolls of lozenges. How much money did she spend?

I had fourteen dollars in dollar bills. I exchanged five of the bills for a five-dollar bill. How many dollar-bills had I then?

There are fourteen days in two weeks. If five days are stormy, how many days are pleasant?

I received fourteen letters this morning, and have answered five. How many more have I to answer?

Jennie had fourteen cocoanut cakes. She gave three to each of her two brothers, kept three herself, and gave the rest to her mother. How many did she give her mother?

I sent two packages by mail that cost fourteen cents. If one of the packages required three three-cent stamps, how much did it cost to send the other package?

If white sugar is nine cents a pound, and maple sugar is fourteen cents a pound, what is the difference in price?

I bought two chairs last week. One cost five dollars and the other fourteen dollars. What was the difference in price?

Express on the board the sum of nine and five.

Express the difference of fourteen and nine.

Express the difference of fourteen and five.

Fill out these expressions:

$9 + 5 =$	9	5	14.
$14 - 9 =$	14	9	5.
$14 - 5 =$	14	5	9.
$5 + 9 =$	5	9	14.
$10 + 4 =$	10	4	14.
$14 - 4 =$	14	4	10.
$14 - 10 =$	14	10	4.
$4 + 10 =$	4	10	14.
$7 \times 2 =$	7	2	14.
$14 \div 2 =$	14	2	7.
$12 \div 2 =$	$12 \div 3 =$		
$10 \div 2 =$	$9 \div 3 =$		
$8 \div 2 =$	$6 \div 3 =$		
$6 \div 2 =$	$3 \div 3 =$		
$4 \div 2 =$	$12 \div 4 =$		
$2 \div 2 =$	$8 \div 4 =$		

Divide fourteen into two such numbers, that one number will be two more than the other number.

What are the two numbers?

Tell me stories for eight and six.

Two squares and two triangles have how many corners together?

A spider with eight legs, and a fly with six legs, have how many legs all together?

Four two-cent pieces of money, and two three-cent pieces of money, are how much money?

I saw two dogs and three boys scampering down the lane. How many feet were scampering over the path?

Two horses got in the farmer's clover, and three boys went to drive them out. How many feet were there trampling down the clover?

A farmer, who had fourteen sheep, sold six sheep. How many sheep had he left?

I ordered some dress goods two weeks ago, and had to wait six days before it came. How many days ago did I receive the goods?

A man who had ten cows and four horses sold six animals. How many had he left?

If you have three three-cent pieces of money, and a five-cent piece, and spend two three-cent pieces, how much money will you have left?

If a hall is fourteen feet high, and a man six feet in height, what is the difference in height?

A boy, who had fourteen quarts of berries to sell, has sold a half-dozen quarts. How many quarts has he left to sell?

Frank picked his pint-cup full of raspberries fourteen times. Three quarts of the raspberries were eaten on the table, and the rest made into sauce. How many pints of the raspberries were made into sauce?

What number taken from fourteen leaves six? What number taken from fourteen leaves eight?

Eight and how many are fourteen?

Six and how many are fourteen?

Fourteen are how many more than six?

Fourteen are how many more than eight?

Express the sum of eight and six, on the board, a half dozen times.

Express the difference of fourteen and six, half as many times.

Fill out the blanks I have left:

$8 + 6 =$	$14 - 4 =$	$6 \div 3 =$
$9 + 5 =$	$7 \times 2 =$	$9 \div 3 =$
$10 + 4 =$	$14 \div 2 =$	$\frac{1}{2}$ of $2 =$
$14 - 8 =$	$12 \div 4 =$	$\frac{1}{2}$ of $4 =$
$14 - 6 =$	$8 \div 4 =$	$\frac{1}{2}$ of $6 =$
$14 - 9 =$	$4 \div 4 =$	$\frac{1}{2}$ of $8 =$
$14 - 5 =$	$12 \div 3 =$	$\frac{1}{2}$ of $10 =$
$14 - 10 =$	$3 \div 3 =$	$\frac{1}{2}$ of $12 =$

$8 + = 14.$	$14 - = 5.$	$12 \div = 2.$
$9 + = 14.$	$14 \div = 7.$	$12 \div = 1.$
$10 + = 14.$	$7 \times = 14.$	$\frac{1}{2}$ of $= 1.$
$14 - = 6.$	$12 \div = 6.$	$\frac{1}{2}$ of $= 6.$
$14 - = 8.$	$12 \div = 4.$	$\frac{1}{2}$ of $= 2.$
$14 - = 4.$	$12 \div = 3.$	$\frac{1}{2}$ of $= 5.$
$14 - = 10.$	$12 \div = 6.$	$\frac{1}{2}$ of $= 3.$
$14 - = 9.$	$12 \div = 12.$	$\frac{1}{2}$ of $= 4.$

12 inches =	1 foot =	inches.
6 inches =	$\frac{1}{2}$ of a foot =	inches.

If I have eight apples, and you have six apples, how many apples must I give you that we may each have the same number of apples? If I give you one apple, how many will you have? How many shall I have? How many shall we have altogether? What two equal numbers have you just found make fourteen?

Seven days and seven days are how many days? Two weeks are how many days?

Two poles, each seven feet long, contain how many feet?

There are two groups of stars, called the Great Dipper and the Little Dipper, and each group has seven stars to form the dipper. How many stars are there in both dippers?

In winter the days are only about seven hours long. How many hours of daylight in two winter days?

Seven bright maples, and seven dark oaks, are how many trees?

Seven humble-bees, and seven morning-glories, are how many blossoms and bees together?

Two little girls, each with seven daisies, have how many blossoms? If seven of the blossoms fall to pieces, how many blossoms will remain?

If you find fourteen pretty shells on the beach, but seven fade and are no longer pretty, how many pretty shells will you have?

If seven and seven make fourteen, how many sevens make fourteen?

Express this fact on the board. ($2 \times 7 = 14$.)

If two sevens make fourteen, what is one-half of fourteen?

Express this fact on the board. ($\frac{1}{2}$ of 14 is 7.)

If fourteen is divided into groups of seven each, how many groups will be found?

Express this fact on the board. ($14 \div 7 = 2$.)

Give me a story for each fact you have expressed.

A boy who made brackets for sale had fourteen of one design. He sold seven of the brackets in one morning. How many had he left?

Nellie is fourteen years old. How old was she when she was only half as old as she is now?

If I can ride fourteen miles on my car-ticket, and I use half of my ticket, how many miles do I ride?

If there are fourteen weeks in one term of the school, how many weeks in one-half a term?

If there are fourteen chairs in a row, how many chairs in half of the row?

In fourteen days how many weeks?

How many seven-cent books can be bought for fourteen cents?

How many sticks, each seven feet long, can be cut from a pole fourteen feet long?

If it takes seven buttons for each jacket, how many jackets will fourteen buttons supply?

A lady who has fourteen geranium blossoms arranged them in groups of seven each. How many groups did she form?

Fill out the blanks in these expressions:

$7 + 7 =$	$10 + 4 =$	$14 \div = 2$.
$2 \times 7 =$	$14 \div 2 =$	$8 + = 14$.
$\frac{1}{2}$ of 14 =	$7 \times 2 =$	$5 + = 14$.
$14 \div 7 =$	$7 + = 14$.	$4 + = 14$.
$8 + 6 =$	$2 \times = 14$.	$14 \div = 7$.
$9 + 5 =$	$\frac{1}{2}$ of = 7.	$7 \times = 14$.
$6 + 8 =$	$14 \div = 14$.	$9 + = 14$.
$5 + 9 =$	$14 \div = 1$.	$6 + = 14$.

Exercise for Review.

If it is three times as far round a wheel as across it, how far is it round a wheel that is four feet across? that is three feet across?

If a circle is three inches across, how many inches is the circle round the outside?

If a circle is four inches across, how far is it round the outside of the circle?

If a circle is six inches round the outside, how far is it across the circle?

If a wheel is nine inches round the outside, how far is it across the wheel?

If a wheel is twelve inches round the outside, how far is it across the wheel?

How many inches long is a stick that is one-half of a foot?

My penholder is half of a foot and three inches long. How long is my penholder?

My pencil is one-fourth of a foot long. How many inches in length is my pencil?

If the cook uses one-fourth of a dozen eggs for a custard-pudding, how many eggs does she use?

If I distribute a dozen cookies equally among four children, how many cookies shall I give to each?

It takes a dozen months to make a year. How many months are there in one-fourth of a year?

The year is divided into four seasons. Each season has the same number of months. How many months has each season? Each season is what part of a year? How many autumn months are there? How many spring months?

If each letter requires a two-cent stamp, how much will it cost to send seven letters? Fourteen cents will buy how many two-cent stamps?

A large milk-pail holds a dozen quarts. How many two-quart pails of milk does it hold? How many three-quart pails of milk? How many four-quart pails of milk? How many six-quart pails of milk? If a six-quart pail of milk be emptied into it, how nearly full will it be? If a four-quart pail of milk be emptied into it, how nearly full will it be? If a three-quart pail of milk be emptied into it?

Fourteen ink-wells will supply how many inkstands, if each inkstand has two wells?

I have a square box whose edge is seven inches. How many inches is it half-way round the box? This box is twice as deep as it is broad. How deep is it?

Harry picked ten quarts of blueberries and four quarts of huckleberries. He sold half of his berries. How many quarts did he sell?

If note-paper is seven cents a quire, how much will two quires cost?

For fourteen cents, how many bunches of envelopes, at seven cents a bunch, can you buy?

How many lines, an inch apart, and each two inches long, can Mary make across a page, if the page is six inches across? If the page is nine inches across? If the page is twelve inches across?

The rails in a fence are three inches wide, and are placed three inches apart. How many rails are there in a foot of the fence? In two feet of the fence? In three feet of the fence? In seven feet of the fence?

If I draw as large a circle as I can in a square that is three inches on a side, how many inches across will the circle be? How many inches round the circle? How many more inches round the square than round the circle?

I bought nine yards of woollen goods, and five yards of silk goods. When I had used six yards of the material, how many yards had I left?

Into how many pieces shall I cut a strip of paper, if I cut through it twice? If I cut it three times? If I cut it eight times? If I cut it twelve times? If I cut it thirteen times?

Into how many pieces does a man saw a stick of wood, if he saws through the stick twice? If he saws through the stick three times? If he saws through the stick once?

How many working days in a week and five days?

How many Sundays in thirteen days, beginning with Monday? How many Tuesdays? How many Fridays? How many Saturdays?

If I make a book by folding a piece of paper once, how many pages will the book have? If I fold the paper twice, how many pages will the book have? If I fold the paper three times, how many leaves will the book have?

See how many different arrangements you can make of the figures 1, 2, and 3.

Here is a button that is two inches round. I will chalk the edge, and you may roll it round once on the board. How long is the line it marks?

Here is a circle that is six inches round. Mark its edge with chalk, and roll it once round on the board. How long is the line which it marks?

Annie has a hoop that is five feet round. How many feet of ground will it go over in turning round twice?

A wheel that is two yards round will go over how many yards in turning round seven times? In turning round five times and half round again? In turning six and a half times round?

How long a time is it from twelve o'clock at noon to eight o'clock in the evening? From one o'clock to eight o'clock? From eight o'clock in the morning to six o'clock in the evening? From six o'clock in the morning to eight o'clock in the evening?

The short hand goes round the face of the clock only once while the long hand is going round twelve times. When the short hand has gone half-way round the clock, how many times has the long hand been round the clock? When the short hand has been a fourth round the clock, how many times has the long hand been round the clock? When the short hand has been a third round the clock, how many times has the long hand been round?

What time is it when the long hand points directly upward, and the short hand in the opposite direction? When it is five minutes past the hour, at what figure does the long hand point? When it is ten minutes past the hour? When it is five minutes of the hour?

The outside of a square flower-border was three feet on a side; the inside was two feet on a side. How much farther round was it on the outside than on the inside?

We will do some buying and selling to-day. George may be salesman, and set his own price on the goods he sells, but must not charge more than twelve cents for any article, as I shall not send any children to the store with more than twelve cents. Look over the goods and tell me what there is to sell. [Boxes of matches, thimbles (clay), marbles (clay), spools of thread (empty spools), lozenges (pasteboard disks), sticks of candy (colored sticks), pencils, papers of pins, papers of needles, pinballs, apples, pears, plums, grapes, peaches, oranges (clay), hat-pins (splints), pens, toy matches, toy tools (paper), postage-stamps, pictures, cards, sand-paper, blotting-paper, tissue-paper, narrow ribbon, narrow lace, newspapers, envelopes, star-books, pencil-tablets.]

Teacher. Nellie may run to the store and buy a thimble for herself and a paper of No. 10 needles for me. (She is given a ten-cent piece.)

Nellie at the store. I wish for a thimble for myself and a paper of No. 10 needles.

Salesman. Thimble two cents, needles five cents, and three cents are ten cents.

T. Tell me about your purchase, Nellie.

Frank may buy a small bottle of ink and a half dozen pens. (Frank is given a five-cent piece and two three-cent pieces.)

Frank. I wish for a bottle of ink and a half dozen pens.

S. Bottle of ink five cents, pens five cents, and one cent are eleven cents.

Harry may buy two sheets of coarse sand-paper and this morning's paper. (Harry is given a five-cent piece and two two-cent pieces.)

S. Two sheets of sand-paper four cents, and the newspaper three cents, and two cents are nine cents.

T. Annie may buy three two-cent postage-stamps and two sheets of white tissue-paper. (Annie is given four three-cent pieces.)

S. Three two-cent stamps six cents, two sheets of tissue-paper four cents, and two cents are twelve cents.

T. Cyrus may be salesman. Willie may buy a half dozen apples and three peaches. (Willie is given two threes and a five.)

S. Six apples three cents, three peaches six cents, and two cents are eleven cents.

T. Nettie may buy what she wishes to buy, and tell me about it afterwards. (Nettie is given some money.)

T. Henry may buy anything he wants, and tell me about it afterwards.

T. Joe may buy two sticks of candy and a watch. Tell me about the purchase when you return.

This exercise will require some tact on the teacher's part at first, that it may run smoothly; but after a few exercises the children will price the goods very fairly, and count out change in a business-

like way. A dollar in small pieces of money will be sufficient. The salesman needs a few cents to begin the sales. The rest of the money is spent by the customers. The exercise tests the children's power to apply their knowledge of number, acquaints them with prices of small articles, and gives practice in handling money.

Ten and one are how many?

Ten and two are how many?

Ten and three are how many?

Ten and four are how many?

Nine and five are how many?

Nine and four are how many?

Nine and three are how many?

Nine and two are how many?

Eight and how many are fourteen?

Eight and how many are twelve?

Eight and how many are ten?

Eight and how many are thirteen?

Eight and how many are eleven?

What number and seven are fourteen?

What number and four are eleven?

What number and seven are thirteen?

What number and five are twelve?

What number and seven are ten?

Express on the board the sum of any two numbers that together make fourteen; that together make ten; that together make thirteen; that together make eleven.

Fill out these blanks:

$2 \times 7 =$

$6 \times 2 =$

$12 \div 4 =$

$7 \times 2 =$

$12 \div 6 =$

$\frac{1}{2} \text{ of } 12 =$

$14 \div 7 =$

$12 \div 2 =$

$\frac{1}{3} \text{ of } 12 =$

$14 \div 2 =$

$3 \times 4 =$

$\frac{1}{4} \text{ of } 12 =$

$\frac{1}{2} \text{ of } 14 =$

$4 \times 3 =$

$4 \text{ gills} =$

$2 \times 6 =$

$12 \div 3 =$

$2 \text{ pints} =$

12 inches =	2 weeks =	$\frac{1}{2}$ of a pint =
12 things =	3 months =	$\frac{1}{2}$ of a quart =
7 days =	$\frac{1}{2}$ of a foot =	$\frac{1}{2}$ of a year =
12 months =	$\frac{1}{4}$ of a foot =	$\frac{1}{2}$ of a dozen =
4 weeks =	$\frac{1}{8}$ of a foot =	$\frac{1}{2}$ of a week =

The Yard.

Here is the longest measure you have yet seen. Some of you are not as tall as this stick, when I stand it up. Who knows how long this stick is? It is a yard long. Who has seen a yard-stick at home? Who has seen anybody measure with such a stick? What did you see measured? Who has seen a yard-measure that was not a stick? You may each take one of these long strips of paper. How long do you think each is? Draw a line on the board a yard long. Measure off a yard on this edge of the table; on the edge of the platform; on the seat of the settee; on the back of the settee; on the edge of the blackboard; on the edge of the door; on the floor; on the window-frame; on the blind. What do you see in this room that you think is a yard long? What have you seen at home that is a yard long? Tell me to-morrow how wide each strip of carpet is that covers the floor of your room. Where have you seen a yard-stick used in measuring a great many things? What is bought by the yard?

Feet in a Yard.

Nettie may put her foot-rule on this yard-stick. Which is the longer measure?

Charley may put his foot-rule on the yard-stick, right against Nettie's. Are the two rules together as long as the yard-stick?

Mary may put her foot-rule right against Charley's. Are the three foot-rules together as long as the yard-stick?

Show me one foot on the yard-stick; another; another.

How many have you shown me? How many feet then make a yard?

Mabel, see if there are three feet in a yard.

I have some lines on the board. Find how long each is. (Three feet.)

Tell me in two ways how long the line is. (Three feet; a yard.)

This table is a yard wide. Find how many feet wide the table is.

The window-sill is a yard long. Find how many feet long the window-sill is.

This part of the blind is a yard high. How many feet high is it?

From this crack in the floor to this crack in the floor is a yard. How many feet between these two cracks?

If the carpet is a yard wide, how many feet wide is it?

If Susie is just a yard in height, how many feet tall is Susie?

The baby is two feet tall, and George is a yard in height. Which is the taller?

If this platform is twelve feet across, how many yards across is it?

If this table is six feet long, how many yards long is it?

If a room is nine feet high, how many yards high is it?

What part of a yard is twelve inches?

Write on the board: 3 feet = 1 yard.

CHAPTER XV.

THE NUMBER FIFTEEN.

§ 37. THE NUMBER FIFTEEN.

Show me fourteen with the tens and ones. Put one more with fourteen. How many more than ten have you now?

Ten and five are how many?

Put your splints back. Take fifteen again. How many tens have you taken? How many ones besides?

Write in words: One ten and five are fifteen.

Who can express this new number in figures?

For what does the figure 1 stand? the figure 5?

Write all the numbers as far as fifteen that are expressed by two figures. How many tens in each of these numbers?

Which has the greatest number of ones besides the one ten?

Which has the least number of ones besides the one ten?

Fifteen is how many more than ten?

A ten-cent piece and a five-cent piece are how much money?

A ten-foot pole and a five-foot pole contain how many feet?

My ten fingers and five of your fingers are how many fingers?

If it is ten miles to my home, how many miles is it there and half-way back?

If a yard of cloth costs ten cents, what will a yard and a half cost?

If a hall is ten feet long and five feet wide, how many feet are in the length and the width together?

What two pieces of money make fifteen cents?

What two pieces of money make fifteen dollars?

If there are fifteen splints before me on the table, and I take five of the splints, how many splints remain?

If you have fifteen more days to go to school, how many days will you have to go after you have been five days?

Fifteen minus five are how many?

Express this fact on the board.

Who has an example for fifteen minus five?

Who can tell me what fifteen minus ten will leave?

If I have fifteen cents, and buy a ten-cent loaf of bread, how many cents shall I have left?

My pencil-tray is fifteen inches in length and width together. Its length is ten inches; what is its width?

If there are fifteen bananas in a bunch, and ten are sold, how many bananas are in the bunch?

Express fifteen minus ten on the board.

Show me fifteen, using a bundle of ten splints.

Now I want to find how many fives in fifteen.

In ten how many fives? and one more five will make how many fives?

In ten and five, then, how many fives?

In fifteen how many fives?

How many five-cent whistles can I buy for fifteen cents?

How many five-cent postage-stamps can I buy for fifteen cents?

If I have fifteen walnuts, to how many boys can I give five apiece?

If you arrange fifteen dots on the board in rows of five each, how many rows will you make?

Fifteen divided by five are how many?

Express this fact on the board a half dozen times.

Give an example for what you have expressed.

If fifteen divided by five are three, how many fives make fifteen?

Three five-dollar gold pieces are how many dollars?

Three five-cent pieces of money are how many cents?

Three five-cent pencils cost how many cents?

You are in school five days a week. How many days are you in school in three weeks?

A pansy-blossom has five petals. How many petals have three pansy-blossoms?

Three fives are how many?

Express this fact five times.

Give an example for what you have expressed.

If you divide fifteen into three equal parts, how many will there be in each part? What then is one-third of fifteen?

A farmer who had fifteen sheep, sold one-third of his flock. How many sheep did he sell?

There were fifteen children in a class, but one stormy day one-third of the class was absent. How many children were absent?

A farmer bought fifteen hens. One-third of the number was jet black. How many were black?

One-third of fifteen is how many?

Express this fact.

Give an example for what you have expressed.

Supply the term that is needed to complete these expressions:

$$10 + 5 =$$

$$15 - 5 =$$

$$5 + 10 =$$

$$15 - 10 =$$

$$15 \div 5 =$$

$$3 \times 5 =$$

$$\frac{1}{3} \text{ of } 15 =$$

$$10 + = 15.$$

$$5 + = 15.$$

$15 \div$	$= 3.$	$+ 5 = 15.$	$- 10 = 5.$
$\frac{1}{3}$ of	$= 5.$	$\times 5 = 15.$	$+ 10 = 15.$
$3 \times$	$= 15.$	$\div 5 = 3.$	$+ 14 = 15.$
$15 -$	$= 5.$	$- 5 = 10.$	$+ 13 = 15.$
$15 -$	$= 10.$	of 15 = 5.	$+ 12 = 15.$

James had ten nuts. Harry had five nuts. How many did both have?

James gave one of his nuts to Harry. How many nuts did each have then? How many did both have?

Nine nuts and six nuts are how many nuts?

If there are nine biscuits on one tea-plate and six on another, how many biscuits are on both plates?

If the distance is nine miles from one station to another, and six miles to the next station, how many miles is it from the first station to the third?

Give me an example for nine and six. Express the fact on the board.

Give an example for fifteen minus six.

Give an example for fifteen minus nine.

Nine and how many are fifteen?

Six and how many are fifteen?

Fifteen minus how many are nine?

Express this fact on the board.

Fifteen minus how many are six?

Express this fact on the board.

I want to find how many threes there are in fifteen. I wonder who will think it out. Think how many threes in nine, then think how many threes in six. How many threes are in nine and in six together? Then how many threes are in fifteen?

Fifteen divided by three are how many?

There are fifteen panes of glass in a window, three panes in each row. How many rows of panes in the window?

Fifteen cents will buy how many three-cent lead pencils?
 how many three-cent stamps? how many three-cent rubbers?
 how many three-cent newspapers?

Tell me a story for fifteen divided by three.

Express the fact on the board.

Since fifteen divided by three are five, how many threes make fifteen?

If I have five three-cent pieces of money, how much money have I?

A spider-wort blossom has three petals. How many petals have five spider-wort blossoms?

A lady is going to make some dresses for five little girls, and it will take three yards of cloth for each dress. How many yards of cloth will she need for all the dresses?

If it takes three yards of ribbon to trim each hat, how many yards of ribbon are needed to trim five hats?

Give an example for five threes are fifteen.

What five equal numbers make fifteen?

What three equal numbers make fifteen?

Five triangles have how many sides? how many corners?

How many toes has a dog on three feet?

How many feet in five yards of string?

How many ounces will three books weigh, each of which weighs five ounces? How many ounces will five books weigh, each of which weighs three ounces?

Supply the missing term in these expressions:

$9 + 6 =$	$3 \times 5 =$	$\div 3 = 5.$
$15 - 6 =$	$15 \div 5 =$	$- 9 = 6.$
$15 - 9 =$	$\frac{1}{3}$ of $15 =$	$- 6 = 9.$
$6 + 9 =$	$15 - 10 =$	$10 + = 15.$
$15 \div 3 =$	$\times 3 = 15.$	$3 \times = 15.$
$5 \times 3 =$	$+ 9 = 15.$	$15 \div = 3.$
$10 + 5 =$	$+ 6 = 15.$	$\frac{1}{3}$ of $= 5.$

The boys chose sides in playing ball. If there were nine boys on one side and six boys on the other side, how many boys were playing? If one from the larger side should go to the other side, how many boys would there be on each side? and how many in all?

Eight and seven are how many?

Who thinks of an example for this fact?

Express the fact on the board.

What two numbers make fifteen, one of which is ten? one of which is nine? one of which is eight? one of which is seven? one of which is six? one of which is five?

What three equal numbers make fifteen?

What five equal numbers make fifteen?

Express the examples I give you on the board:

[It is expected that the pupil will express the operation and answer by means of figures and signs of operations.]

There were fifteen chickens roosting on a fence, and nine flew down. How many were left on the fence?

There were fifteen jelly-fish on the beach, but ten of them melted in the sun. How many were left?

A star-fish has five arms or rays. How many rays have three star-fish?

A clover leaf has three parts. How many parts have five clover leaves?

When peaches are three cents apiece, how many can be bought for fifteen cents?

If I have fifteen cents in three equal pieces of money, what is each piece of money?

If I have fifteen cents in five equal pieces of money, what is each piece of money?

A fence is seven feet long one side of the gate and one foot longer on the other side of the gate. How long is the fence besides the gate?

Four and five and six are how many?

You may express this on the board.

Seven and three and five are how many?

Express this on the board.

Five and three and seven are how many?

Express this on the board.

I will express these examples a new way.

[Let teacher express in a vertical column with the answer underneath.]

Express four and two and five the new way.

Express five and six and two.

Express three and four and five and two.

Express one, two, three, four, and five.

Express three, two, and ten.

Express one, two, and twelve.

Take this number-work

$10 + 5 =$	$7 + 7 =$	$4 + 3 =$	$15 \div 3 =$
$10 + 4 =$	$7 + 2 =$	$2 \times 2 =$	$15 \div 5 =$
$10 + 3 =$	$7 + 6 =$	$2 \times 7 =$	$14 \div 2 =$
$10 + 2 =$	$7 + 3 =$	$2 \times 3 =$	$14 \div 7 =$
$10 + 1 =$	$7 + 5 =$	$2 \times 6 =$	$12 \div 2 =$
$10 + 0 =$	$7 + 4 =$	$2 \times 4 =$	$12 \div 3 =$
$9 + 6 =$	$6 + 5 =$	$2 \times 5 =$	$12 \div 4 =$
$9 + 2 =$	$6 + 2 =$	$3 \times 2 =$	$12 \div 6 =$
$9 + 5 =$	$6 + 4 =$	$3 \times 3 =$	$10 \div 2 =$
$9 + 3 =$	$6 + 3 =$	$3 \times 4 =$	$10 \div 5 =$
$9 + 4 =$	$6 + 6 =$	$3 \times 5 =$	$9 \div 3 =$
$8 + 2 =$	$5 + 5 =$	$4 \times 2 =$	$8 \div 2 =$
$8 + 7 =$	$5 + 2 =$	$4 \times 3 =$	$8 \div 4 =$
$8 + 3 =$	$5 + 4 =$	$5 \times 2 =$	$6 \div 2 =$
$8 + 6 =$	$5 + 3 =$	$5 \times 3 =$	$6 \div 3 =$
$8 + 4 =$	$4 + 4 =$	$6 \times 2 =$	$\frac{1}{2}$ of 14 =
$8 + 5 =$	$4 + 2 =$	$7 \times 2 =$	$\frac{1}{2}$ of 12 =

$\frac{1}{2}$ of 10 =	$\frac{1}{4}$ of 1 =	2 pints =	2	4
$\frac{1}{2}$ of 8 =	$\frac{1}{4}$ of 0 =	12 inches =	4	3
$\frac{1}{2}$ of 6 =	$\frac{1}{8}$ of 8 =	3 feet =	3	2
$\frac{1}{2}$ of 4 =	$\frac{1}{8}$ of 15 =	12 things =	4	1
$\frac{1}{2}$ of 2 =	$\frac{1}{8}$ of 12 =		—	—
$\frac{1}{2}$ of 1 =	$\frac{1}{8}$ of 9 =			
$\frac{1}{2}$ of 0 =	$\frac{1}{8}$ of 6 =	3	1	2
$\frac{1}{4}$ of 12 =	$\frac{1}{8}$ of 3 =	2	2	5
$\frac{1}{4}$ of 8 =	4 gills =	4	3	3
$\frac{1}{4}$ of 4 =		6	4	4
		—	—	—

The Gallon.

Who has heard any one speak of a *gallon* of molasses? a gallon of oil? a gallon of syrup?

I hold in my hand a measure that holds just a gallon.

Who has seen such a measure before?

Who has anything at home that holds just a gallon?

Who has heard of a gallon-jug? a gallon-can?

Which holds more, this quart or this gallon measure?

You may find how many quarts a gallon will hold.

How many quarts in a gallon?

In a gallon of vinegar, how many quarts of vinegar?

If I buy a gallon of molasses, how many quarts do I buy?

In half a gallon of oil, how many quarts of oil?

In a half-gallon of ink, how many quarts of ink?

How many two-quart pails are required to hold a gallon?

How many pint pails are required to hold a gallon?

If a pint of water weighs one pound, how much will a gallon of water weigh?

How many quarts make a gallon?

Write on the board: 4 quarts = 1 gallon.

CHAPTER XVI.

THE NUMBER SIXTEEN.

§ 38. THE NUMBER SIXTEEN.

Take ten splints. Take six more splints. What number of splints have you?

Ten and six are how many?

Who can write the word *sixteen*?

Who can express sixteen in figures?

How many tens in sixteen? How many ones beside?

Which figure stands for the one ten?

Which figure shows that there are six ones besides the ten in sixteen?

Express all the numbers that contain only one ten.

Which is the largest number you have expressed? Which is the smallest?

A ten-cent piece of money and two three-cent pieces of money are how much money?

A ten-cent piece of money and three two-cent pieces of money are how much money?

Two five-cent pieces of money and two three-cent pieces of money are how much money?

If one keg holds ten gallons of cider-apple sauce, and another keg holds six gallons, how many gallons will both kegs hold together?

There were sixteen boys in a class, but six were promoted to another grade. How many boys were left in the class?

There were sixteen swallows' nests in a bank, but the bank caved in and destroyed six nests. How many nests were then in the bank?

Sixteen boys were playing ball, but ten ran home to dinner. How many boys were then playing ball?

Sixteen crows alighted in a corn-field. Two of them were frightened away by the flapping garments of an old scarecrow, but the rest did not care a fig. How many stayed and ate the corn?

Ten and how many are sixteen?

Express this fact on the board.

Sixteen minus ten are how many?

Express this fact on the board.

Sixteen minus what number are ten?

Express this fact on the board.

If you take a splint from the bundle of tens and put it with six, what two numbers will you then have? Ten and six are how many? Nine and seven are how many?

Give an example for nine and seven.

Express this fact on the board.

Give an example for sixteen minus nine.

Express this fact on the board.

Give an example for sixteen minus seven.

Express this fact on the board.

If Henry finds nine eggs in one nest and seven in another nest, how many eggs does he find in all?

In two pods there were sixteen peas. If there were nine peas in one pod, how many peas were in the other pod?

Johnnie was peddling chestnuts. He started out with sixteen quarts, and sold nine quarts within half an hour. How many quarts had he then to sell?

An old ladder lay in the loft with several rounds broken out. It had sixteen rounds when it was new; now only seven remained. How many were broken?

Express on the board: Nine and seven are sixteen.

If you take one from nine, what number will remain?

Express eight below nine.

Now put the number you take from nine with seven, and what number will you have?

Express this eight below seven.

What two numbers have you made by taking one from nine and adding it to seven?

What must be the sum of these two numbers?

Express this fact.

If eight and eight are sixteen, how many eights are in sixteen?

Express the fact: Sixteen divided by eight are two.

If there are two eights in sixteen, how many eights make sixteen?

Express the fact: Two eights are sixteen.

What two equal numbers have you found then in sixteen? What part of sixteen must each of the numbers be?

What then is one-half of sixteen?

Express the fact: One-half of sixteen is eight.

If *two* eights are sixteen, what will remain if *one* eight is taken away?

Sixteen minus eight then are how many?

Express this fact.

Read the facts you have expressed.

Illustrate each fact by drawings on the board.

A flock of sheep was going along the road. Eight were marked with black spots and eight were white. How many sheep were in the flock?

Sixteen fruit trees blossomed in our orchard, but only eight bore fruit. How many did not bear fruit?

In a horse-car there were eight persons on each side. How many persons were in the car?

How many eight-cent spools of silk can I buy for sixteen cents?

Two boys had sixteen small pears which they divided equally between themselves. How many pears had each?

If I ride sixteen miles, but you ride only one-half as far, how far do you ride?

Read what I have expressed ($8 + 8 = 16$).

What two equal numbers make eight?

Express "four and four" beneath the first eight; beneath the second eight.

Read each eight in fours.

If eight and eight are sixteen, what is the sum of four and four and four and four? How many fours? Four fours then are how many?

Express: Four fours are sixteen.

If there are four panes of glass in each window, how many panes of glass are in four windows?

Four chairs have how many legs together?

Four squares have how many sides all together? have how many corners?

If one quart of milk costs four cents, what will a gallon of milk cost?

If four fours make sixteen, how many fours can be taken from sixteen? Sixteen divided by four are how many then?

Express this fact.

Sixteen quarts of milk will fill how many gallon-cans?

Sixteen cents will buy how many yards of ribbon at four cents a yard?

Sixteen horses will supply how many four-horse coaches?

Into what four equal numbers can sixteen be divided?
What part of sixteen is each of the numbers?

What then is one-fourth of sixteen? Express this fact.

There were sixteen empty cars on a freight train when it started from the station, but a quarter of them were switched off at the next station. How many cars were switched off?

A summer day is sixteen hours long. How long is a fourth of the day?

This string is five yards and a foot long. How many feet long is one-fourth of the string?

Edwin had sixteen hens but he sold four hens. What part of his whole number of hens did he sell?

Supply the missing term in these expressions:

$8 + 8 =$	$\frac{1}{4}$ of 16 =	4 gills =
$16 - 8 =$	$16 - = 10.$	2 pints =
$2 \times 8 =$	$16 - = 9.$	4 quarts =
$16 \div 8 =$	$16 - = 8.$	12 inches =
$\frac{1}{2}$ of 16 =	$10 + = 16.$	3 feet =
$10 + 6 =$	$9 + = 16.$	12 things =
$16 - 10 =$	$8 + = 16.$	
$16 - 6 =$	$2 \times = 16.$	3 2
$9 + 7 =$	$4 \times = 16.$	4 4
$16 - 9 =$	$16 \div = 2.$	2 3
$16 - 7 =$	$16 \div = 4.$	3 3
$4 \times 4 =$	$\frac{1}{2}$ of. = 8.	4 3
$16 \div 4 =$	$\frac{1}{4}$ of = 4.	— —

Read what I have written ($8 + 8 = 16$).

How many twos make eight? What then is just the same as eight? (4×2 .)

Express two and two and two and two under each eight. Read, Eight and eight are sixteen, by twos ($2 + 2 + 2 + 2 + 2 + 2 + 2 + 2 = 16$). How many twos? How many twos make sixteen then?

Express: Eight twos are sixteen.

If eight twos make sixteen, into how many twos may sixteen be divided?

Express: Sixteen divided by two are eight.

How many pairs of gloves in sixteen gloves?

Ned has sixteen cents in two-cent pieces. How many two-cent pieces has he?

Eight spans of horses are how many horses?

Eight yokes of oxen are how many oxen?

Eight birds have how many wings?

What eight equal numbers make sixteen? What part of sixteen is each number? What number then is one-eighth of sixteen?

Express: One-eighth of sixteen is two.

We have a measure which holds sixteen quarts. If it is an eighth full how many quarts are in the measure?

One side of a long and narrow bench is sixteen feet long; the shorter side is two feet long. What part of the length is the width?

How many strips of carpeting two feet wide will it take to go across a room sixteen feet long? What part of the length of the room is each strip of carpeting?

Fred has ten watermelons and six muskmelons in his little garden. How many melons has he all together?

There are nine buttons on one of Ned's boots, but only seven on the other boot. How many buttons on both boots?

Annie is ripping buttons off of old dresses. She has ripped eight off of one dress and eight off of another dress. How many buttons has she ripped off all together?

There were sixteen boys with soldier caps. Six caps had silver bands and the rest had red bands. How many had red bands?

At a summer hotel there were sixteen rabbits playing on the lawn. Seven were white and the rest gray. How many were gray?

If Jack has sixteen errands to do and does eight errands, how many more errands has he to do? When he has done nine errands, how many has he still to do?

James picked sixteen quarts of cranberries. He put ten quarts in one basket, and the rest in another basket. How many quarts of cranberries were in the second basket?

If it costs two cents to send an ordinary letter through the mail, how many cents will it cost to send eight letters?

How many quarts are there in four gallons?

How many gills are there in four pints?

If a paper of needles costs eight cents, what will two papers of needles cost?

How many two-cent pencils can I buy for sixteen cents? How many two-cent stamps?

When lemons are four cents apiece, how many lemons can be bought for sixteen cents?

When slate pencils can be bought for eight cents a dozen, how many dozen can be bought for sixteen cents?

Jennie has sixteen peanuts but she gave half of what she had to her sister. How many did she give her sister?

A man started one morning to ride sixteen miles. When he had gone one-fourth of the distance, he found the horse had lost a shoe and could go no farther on the rough road, so he turned back. How far had he gone?

A lady made sixteen turnovers one Thanksgiving for her eight little nieces. How many turnovers could each have?

Give me a number that you can take from sixteen. (Eight.) Sixteen minus eight are how many? I will express this on the board.

$$\begin{array}{r} 16 \\ - 8 \\ \hline 8 \end{array}$$

Give another number that you can take from sixteen, and tell me the result. (Nine from sixteen are seven.) I will express this on the board.

$$\begin{array}{r} 16 \\ -9 \\ \hline 7 \end{array}$$

You may express in the same way: Sixteen minus six; fourteen minus seven; thirteen minus five; twelve minus six; eleven minus four; ten minus six.

Read what I express:

$$\begin{array}{r} 15 \\ -10 \\ \hline 5 \end{array} \quad \begin{array}{r} 12 \\ -10 \\ \hline 2 \end{array} \quad \begin{array}{r} 16 \\ -6 \\ \hline 10 \end{array} \quad \begin{array}{r} 15 \\ -5 \\ \hline 10 \end{array} \quad \begin{array}{r} 14 \\ -10 \\ \hline 4 \end{array} \quad \begin{array}{r} 11 \\ -10 \\ \hline 1 \end{array}$$

$$\begin{array}{r} 16 \\ -7 \\ \hline 9 \end{array} \quad \begin{array}{r} 15 \\ -6 \\ \hline 9 \end{array} \quad \begin{array}{r} 13 \\ -10 \\ \hline 3 \end{array} \quad \begin{array}{r} 10 \\ -10 \\ \hline 0 \end{array} \quad \begin{array}{r} 16 \\ -8 \\ \hline 8 \end{array} \quad \begin{array}{r} 15 \\ -7 \\ \hline 8 \end{array}$$

Complete these expressions:

$$\begin{array}{lll} 16 \div 2 = & 16 \div 8 = & \div 4 = 4. \\ 8 \times 2 = & 2 \times 8 = & \times 4 = 16. \\ \frac{1}{8} \text{ of } 16 = & \frac{1}{2} \text{ of } 16 = & \text{of } 16 = 4. \\ 16 \div 4 = & \div 8 = 2. & \div 2 = 8. \\ 4 \times 4 = & \times 8 = 16. & \times 2 = 16. \\ \frac{1}{4} \text{ of } 16 = & \text{of } 16 = 8. & \text{of } 16 = 2. \end{array}$$

$$\begin{array}{r} 16 \\ -8 \\ \hline \end{array} \quad \begin{array}{r} 15 \\ -8 \\ \hline \end{array} \quad \begin{array}{r} 14 \\ -8 \\ \hline \end{array} \quad \begin{array}{r} 13 \\ -8 \\ \hline \end{array} \quad \begin{array}{r} 16 \\ -9 \\ \hline \end{array} \quad \begin{array}{r} 15 \\ -9 \\ \hline \end{array}$$

$$\begin{array}{r} 14 \\ -9 \\ \hline \end{array} \quad \begin{array}{r} 13 \\ -9 \\ \hline \end{array} \quad \begin{array}{r} 16 \\ -7 \\ \hline \end{array} \quad \begin{array}{r} 15 \\ -7 \\ \hline \end{array} \quad \begin{array}{r} 14 \\ -7 \\ \hline \end{array} \quad \begin{array}{r} 13 \\ -7 \\ \hline \end{array}$$

$$\begin{array}{r} 13 \\ -10 \\ \hline \end{array} \quad \begin{array}{r} 16 \\ -10 \\ \hline \end{array} \quad \begin{array}{r} 15 \\ -10 \\ \hline \end{array} \quad \begin{array}{r} 14 \\ -10 \\ \hline \end{array} \quad \begin{array}{r} 13 \\ -3 \\ \hline \end{array} \quad \begin{array}{r} 16 \\ -6 \\ \hline \end{array}$$

Exercise for Review.

In two months from to-day will be New Year's day. What day of the month is it? What month is it? How many months have passed since last New Year's day?

If spring and summer of this year are gone, how many months remain to the year? If one-half of this year is gone, how many months remain to the year? When one-fourth of a year is gone, how many months are gone? How many months remain?

How many weeks in a month and fourteen days?

In twelve quarter-dollars how many dollars?

In sixteen quarter-dollars how many dollars?

In sixteen half-dollars how many dollars?

If gingham is sixteen cents a yard, what will a half-yard cost? What will a quarter of a yard cost? What will one eighth of a yard cost?

Sixteen pint bottles will hold how many quarts of wine?

If James is fourteen years old, how many years ago was he one-half as old as he is now?

I have a ten-cent piece. What other two pieces of money may I have to make fourteen cents?

If I write eight letters to-day and six to-morrow, how many letters shall I write?

Mary has nine figs and Susie has five figs. How many figs have they together?

If Mary eats one of her figs and Susie gets another fig, how many will both have?

Fourteen equals how many twos?

Fourteen equals how many sevens?

If this room is five yards long, how many feet long is the room?

A stick that is fifteen feet long can be cut into how many yard-sticks?

When John measured the platform he found it would contain his foot-rule fifteen times. How many yards long is the platform?

Fifteen is how many threes?

If you are in school five hours a day, how many hours are you in school three days?

Nellie drew a triangle which was five inches on each side. How far was it round the triangle?

I saw a garden plot in the shape of a triangle that was five feet on a side. How far was it round the plot?

If plants were set around the outside a foot apart, how many plants were set around the bed? Draw the plot and see if you are right.

A gardener had six Scotch roses and half as many more English roses. How many roses had he in all?

If it takes six yards of dress goods to make Fanny a dress, and half as many more yards to make her mother a dress, how many yards are required for both dresses?

How many strokes will the clock give in striking seven and eight?

Harry went to visit his cousin for a week but stayed eight days more than a week. How many days did he stay all together?

A round block is fifteen inches round and one-third as many inches across. How many inches across is the block?

My paper-weight is fifteen inches round and one-third as many inches across. How many inches across is the weight?

This stick is a foot and three inches in length. How many inches long is the stick?

Annie is five years old and her brother twice as old. What is the sum of their ages?

Henry is fifteen years old and his brother five years old. What is the difference of their ages?

A cask has fifteen gallons of apple sauce in it. After seven gallons are dipped out how many gallons will remain in the cask?

Count by threes to fifteen.

Count by fives to fifteen.

What three equal numbers make fifteen?

What five equal numbers make fifteen?

Harry had six words written on one side of his slate, and one more than six words written on the other side of his slate. How many words had he written in all?

Thirteen is how many more than a dozen?

I have a ten-cent piece. Tell me what other piece of money I must have to make thirteen cents.

If I pick six quarts and a half of raspberries how many pints do I pick?

A man bought eight pounds of brown sugar and five pounds of white sugar. How many pounds of sugar did he buy?

There are eight cows and five calves in a pasture. How many cattle are in the pasture?

Make up an example for what I express on the board :

8 + 5	9 + 4	× 7 = 14.	
9 + 3	9 + 5	× 3 = 15.	
10 + 4	9 + 6	× 4 = 16.	
7 + 5	9 + 7	+ 10 = 16.	
6 + 5	6 + 7	+ 7 = 12.	
3	1	4	2
4	2	5	5
6	7	3	4
3	5	4	3
<hr/>	<hr/>	<hr/>	<hr/>

16	15	14	13
<u>- 6</u>	<u>- 5</u>	<u>- 10</u>	<u>- 10</u>
15	15	16	16
<u>- 7</u>	<u>- 13</u>	<u>- 14</u>	<u>- 12</u>

Express on the board :

One-half of two.

One-half of six.

One-half of ten.

One-half of fourteen.

One-half of sixteen.

One-half of twelve.

One-half of eight.

One-half of four.

One-third of three.

One-third of nine.

One-third of fifteen.

One-third of twelve.

One-third of six.

One-fourth of four.

One-fourth of twelve.

One-fourth of eight.

One-fourth of sixteen.

One-eighth of sixteen.

One-eighth of eight.

One-half of one.

Fill out :

$8 + 4 =$	$+ 8 = 16.$
$9 + 3 =$	$+ 8 = 14.$
$10 + 2 =$	$+ 8 = 12.$
$11 + 1 =$	$+ 8 = 10.$
$7 + 5 =$	$- 8 = 8.$
$6 + 6 =$	$- 8 = 6.$
$7 + 6 =$	$- 8 = 4.$
$8 + 5 =$	$- 8 = 2.$

CHAPTER XVII.

THE NUMBER SEVENTEEN.

§ 39. THE NUMBER SEVENTEEN.

Take a bundle of ten splints. Take seven more splints.
Who knows how many ten and seven are?

Express on the board: Ten and seven are seventeen.

Give an example for ten and seven.

Seventeen minus seven are how many?

Seventeen minus ten are how many?

Express on the board all the facts in seventeen that you know.

If there were ten geranium blossoms on a plant yesterday, and now there are seven more blossoms, how many blossoms are on my plant?

If one of yesterday's blossoms drop off, how many old blossoms will remain? If one more new blossom comes, how many new blossoms will there be? If one blossom dies and one new blossom comes, are there as many now as before? Nine and eight are how many then?

Three three-cent pieces and four two-cent pieces of money are how much money?

Name two numbers one of which is one more than the other that together make seventeen.

Amy is seventeen years old. How old was she seven years ago? How old was she ten years ago? nine years ago? eight years ago?

Ned's language-book and writing-book together cost seventeen cents. If his language-book cost nine cents, what did his writing-book cost?

If a man's coat cost seventeen dollars, and a boy's jacket cost eight dollars, how much more did the coat cost than the jacket?

Two five-cent pieces of money, two three-cent pieces, and one cent are how much money?

Fill out the blanks:

$10 + 7 =$	17	17
$17 - 10 =$	$- 10$	$- 9$
$9 + 8 =$	<hr/>	<hr/>
$17 - 7 =$	17	17
$17 - 9 =$	$- 8$	$- 7$
$17 - 8 =$	<hr/>	<hr/>
$17 \times 1 =$	17	17
$17 \div 1 =$	$- 5$	$- 6$
	<hr/>	<hr/>

One-Sixth.

Into how many pieces have I divided this circle? (Six pieces.) Into what kind of pieces? (Equal.) Into what then have I divided this circle?

Into what have I divided this ring? (Six equal pieces.)

Into what have I divided this apple? this leaf of paper?

Into how many equal parts have I divided this line?

Each part of the line is one-sixth of the whole line. Show me one-sixth of the line.

Each one of the six equal parts of the apple is one-sixth of the apple. Show me one-sixth of the apple.

Show me one-sixth of the ring I divided.

How many such parts will it take to make the ring?

Show me one-sixth of the circle I divided.

How many such parts will it take to make the circle?

Draw a triangle. Divide the base into halves, and divide each half into thirds. Into how many equal parts is the base divided? What part of the whole base is each of the parts into which it is divided? Write "s" under each sixth. How many times have you written "s"?

Connect the vertex with each point of division in the base. How many triangles have you made? What part of the large triangle is each small triangle?

See if you can divide a circle into sixths. This rectangle into sixths.

Show me what you think to be a sixth of the edge of this table; of the other edge of the table.

What part of this pencil is one-sixth of the whole pencil?

Call these six blocks a pie. Divide this pie into six equal pieces. What part of the whole pie is each piece?



Call these six blocks an orange that is split open on one side so that it lies nearly flat. Divide the orange into sixths.

Take twelve blocks. Divide the number into six equal groups. What part of twelve is each group? How many in each group?

What number then is one-sixth of twelve? How many such numbers will it take to make twelve?

If you eat one-sixth of a dozen eggs, how many eggs will you eat?

Into how many sixths can you cut a pie? into how many fourths? into how many thirds? into how many halves?

Which is larger, a half or a sixth of the same pie? a half or a fourth of the same pie?

Express: One-sixth of twelve is two. One-sixth of six is one.

CHAPTER XVIII.

THE NUMBER EIGHTEEN.

§ 40. THE NUMBER EIGHTEEN.

Who knows how many ten and eight are? Find out with the splints if you do not know.

Express the fact on the board.

Give an example for the fact.

If you take one from the ten and put it with eight, what two equal numbers will you have? What is the sum of nine and nine?

Give examples for nine and nine.

Since nine and nine make eighteen, how many nines make eighteen?

Express: Two nines are eighteen.

If each ball club has nine boys, how many boys will it take for two ball clubs?

If there are nine rings on one curtain rod, how many are there on two curtain rods?

If two nines make eighteen, how many nines will you find in eighteen?

Express: Eighteen divided by nine are two.

I ironed eighteen handkerchiefs, and laid them in piles with nine in each pile. How many piles did I make?

When calico is nine cents a yard, how many yards can be bought for eighteen cents?

Into what two equal numbers may eighteen be divided?

What part of eighteen is each number? What then is one-half of eighteen?

We had eighteen young turkeys, but half of them strayed away in the wet grass and died. How many had we then?

John picked eighteen quarts of cranberries, and Harry picked half as many quarts. How many quarts of cranberries did Harry pick?

Who knows how many sixes there are in eighteen? Find out with the splints if you are not sure.

Express this fact on the board.

If there are eighteen pencils in a box, done up in bundles of six each, how many bundles are there in the box?

If there are eighteen pear trees in an orchard, arranged in rows of six each, how many rows of pear trees are there?

A man who is packing eggs in a box puts a half dozen eggs in each layer. How many layers will eighteen eggs make?

Give me an example for eighteen divided by six.

If you find three sixes in eighteen, how many sixes must you take to make eighteen?

Express: Three sixes are eighteen.

If you buy a half dozen oranges to-day, to-morrow, and the next day, how many oranges will you buy in all?

If there are half a dozen pies on each shelf, how many pies are on three shelves? How many pies are there on two shelves? What part of a dozen on the next shelf?

How many did you say there were on the three shelves? Then one dozen and a half are how many?

A dozen and a half apples are how many apples? A dozen and a half eggs are how many eggs?

What three equal numbers make eighteen?

What part of eighteen is each of the three equal numbers which make eighteen?

What part of eighteen is six?

Express on the board : One-third of eighteen is six.

Give an example for this fact.

Express on the board : Six and six and six are eighteen.

What two equal numbers make six ?

Write "three and three " under each six.

Read six and six and six are eighteen, in threes.

How many threes are eighteen ?

Express : Six threes are eighteen.

Give an example for this fact.

If you have six three-cent pieces, how much money have you ?

If you buy a half dozen three-cent lead pencils, how much money will you pay ?

Six triangles have how many sides ? have how many corners ?

If you put a dot in each corner of six triangles, how many dots will you make ?

If it takes six threes to make eighteen, how many threes can you find in eighteen ?

Express this fact on the board.

Eighteen cents will buy how many three-cent pencils ? how many three-cent books ? how many peaches at three cents each ?

Give an example for eighteen divided by three.

What six equal numbers make eighteen ?

What part of eighteen is each of these numbers ? What part then of eighteen is three ?

Express : One-sixth of eighteen is three.

If I distribute eighteen pencils equally among six children, how many pencils do I give each child ?

A lady cut a cake into eighteen equal pieces. If a sixth of the cake was eaten, how many pieces were eaten ?

If a large watermelon was cut into eighteen pieces, and I

put a sixth of the number of pieces on a separate plate, how many pieces did I put on the plate?

Give an example for one-sixth of eighteen.

Who can tell how many twos in eighteen? Find out with the splints if you do not know.

Express the fact on the board.

How many two-cent stamps can I buy for eighteen cents?

How many pairs of gloves are there in eighteen gloves?

How many quarts are there in eighteen pints?

Eighteen shafts will supply how many wagons?

If there are nine twos in eighteen, how many two-cent pieces will it take to equal eighteen cents?

How many knobs are required for nine doors?

How many eyes have nine boys?

Nine oysters have how many shells?

Nine sheets of paper have how many leaves?

Who has an example for nine twos are eighteen?

Express on the board all the facts in eighteen. Who has eighteen facts expressed?

Illustrate with drawings half of the facts you have expressed.

Tell me about your drawings.

Illustrate the examples I give you.

One man rowed down the river nine miles, and another man starting at the same place rowed up the river nine miles.

There were three rows of pies in the pantry, six in each row.

There were enough quart-bottles on a shelf to hold eighteen pints.

There were enough three-quart pickle jars to hold eighteen quarts of pickles.

There were enough pans in the dairy to hold eighteen quarts of milk if six quarts were put in each pan.

Express the examples I give you, and also the answer. (The pupil understands by this direction that he is to express the operation which the conditions of each problem require, and the result of the operation.)

There were ten English sparrows drinking out of the basin of a fountain, and eight more on the ground around the fountain. How many sparrows were there in all? ($10 + 8 = 18$.)

If one base-ball nine plays against another base-ball nine, how many boys are playing? ($9 + 9 = 18$.)

I bought three quarts of hulled corn at six cents a quart. What did I pay? ($3 \times 6 = 18$.)

I bought six hat pins at three cents apiece. What did I pay? ($6 \times 3 = 18$.)

I had eighteen curtain rings, and it took two rings for each curtain loop. How many loops could I supply with rings? ($18 \div 2 = 9$.)

There were eighteen feet in a chain. How many yards were there in the chain? ($18 \div 3 = 6$.)

If it takes six strips of carpeting, each strip a yard wide, to go across my room, how many feet long is my room? ($6 \times 3 = 18$.)

This morning the cook had a dozen and a half eggs. She used a third of them in making a pudding for dinner. How many eggs did she use? ($\frac{1}{3}$ of $18 = 6$.)

A boy who had eighteen rabbits sold half of them. How many rabbits did he sell? ($\frac{1}{2}$ of $18 = 9$.)

It took eighteen yards of ribbon to trim six hats. How many yards of ribbon were used for each hat? ($\frac{1}{6}$ of $18 = 3$.)

I distributed eighteen nuts equally between two boys. How many nuts did I give to each boy? ($\frac{1}{2}$ of $18 = 9$.)

Three boys together earned eighteen cents, and all received an equal amount of money. How much did each receive? ($\frac{1}{3}$ of $18 = 6$.)

Supply the missing term in these expressions:

$18 \div 2 =$	$18 - = 10.$
$18 \div 3 =$	$18 - = 8.$
$18 \div 6 =$	$18 - = 9.$
$18 \div 9 =$	$18 - = 12.$
$\frac{1}{2}$ of 18 =	$9 + = 18.$
$\frac{1}{3}$ of 18 =	$10 + = 18.$
$\frac{1}{6}$ of 18 =	$8 + = 18.$
$9 \times 2 =$	$12 + = 18.$
$6 \times 3 =$	$9 \times = 18.$
$2 \times 9 =$	$2 \times = 18.$
$3 \times 6 =$	$6 \times = 18.$
$10 + 8 =$	$3 \times = 18.$
$9 + 9 =$	$18 \div = 9.$
$18 - 10 =$	$18 \div = 6.$
$18 - 9 =$	$18 \div = 3.$
$18 - 8 =$	$18 \div = 2.$
$8 + 10 =$	$18 \div = 18.$
$18 \div 18 =$	$\frac{1}{2}$ of = 9.
$9 + 9 =$	$\frac{1}{3}$ of = 6.
$18 - 6 =$	$\frac{1}{6}$ of = 3.
$18 - 18 =$	$6 + = 18.$
$12 + 6 =$	$18 \times = 18.$

18	18	18	18
<u>-8</u>	<u>-13</u>	<u>-14</u>	<u>-5</u>
18	18	18	18
<u>-10</u>	<u>-11</u>	<u>-17</u>	<u>-2</u>
18	18	18	18
<u>-12</u>	<u>-7</u>	<u>-16</u>	<u>-4</u>
18	18	18	18
<u>-6</u>	<u>-9</u>	<u>-15</u>	<u>-3</u>

CHAPTER XIX.

THE NUMBER NINETEEN.

§ 41. THE NUMBER NINETEEN.

Show me a bundle of ten splints, and nine single splints.
Who knows what number he has shown me?

Express the number on the board.

A ten-cent piece and three three-cent pieces of money will make how much money?

Two five-cent pieces of money and three three-cent pieces of money will make how much money?

Give examples for ten and nine.

Express just the sum of ten and nine on the board. (19.)

Express underneath it the sum of ten and eight.

Express the sum of ten and seven; of ten and six; of ten and five; of ten and four; of ten and three; of ten and two; of ten and one; of ten and none.

How many tens has each one of these numbers?

Which number has the most ones besides the one ten? Which number has eight ones beside the one ten? Which number has seven ones besides the one ten?

Show me the column of tens; the column of ones.

What is the difference between none and nine? between ten and nineteen? between one and nine? between eleven and nineteen? between four and nine? between fourteen and nineteen? between five and eight? between fifteen and eighteen? between fourteen and eighteen? between fifteen and nineteen? between thirteen and sixteen? between twelve and nineteen? .

Express : Two eights are sixteen.
 Three fives are fifteen.
 Four threes are twelve.
 Five threes are fifteen.
 Six threes are eighteen.

I will express what you have written in this way :

8	5	3	3	3
2	3	4	5	6
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
16	15	12	15	18

Express in this new way :

Three fours are twelve.
 Two nines are eighteen.
 Four fours are sixteen.
 Three sixes are eighteen.
 Nine twos are eighteen.
 Two sixes are twelve.

Exercise for Review.

How many strokes will a clock give in striking five and six? in striking six and seven? in striking seven and eight?

How many strokes will a clock give between half-past three and half-past six?

If the face of a clock is a foot round, how many inches does the point of the long hand move over in going from twelve to six? in going from twelve to twelve? in going once and a half round the clock?

How long a time will it take the long hand to move over eighteen inches? How long will it take the short hand to move over eighteen inches?

If that blackboard is eighteen feet in length, how many yards long is the blackboard?

If this table is six feet on one side, and three feet on the other side, how many yards is it all round the table?

This stick is a foot and a half long. How many inches in length is the stick?

The distance from the floor to the first round of a chair is half a foot; from the first round to the next round is half a foot, and from the second round to the seat of the chair half a foot. How many inches high is the seat of the chair?

If wood is sawed into sticks a foot and a half long, how long must the wood be to make two sticks? What part of a yard?

If a shed is eighteen feet from the roof to the ground, how many yards is the roof from the ground?

A yoke of oxen will require how many shoes?

Four horses will require how many shoes?

Sixteen quarts of molasses will fill how many gallon jugs?

Eighteen half-pint jelly glasses will hold how many pints of jelly? how many quarts of jelly? How many more glasses will it take to hold five quarts of jelly?

A week and ten more days are how many days?

I bought two bottles of ink. For one bottle I paid nine cents, and for the other bottle one cent less. How much did I pay for both bottles of ink?

Eighteen equals how many twos? how many threes? how many sixes? how many nines?

What is one of the nine equal numbers that make eighteen? one of the six equal numbers? one of the three equal numbers? one of the two equal numbers?

Sixteen equals how many twos? how many fours? how many eights?

Fifteen equals how many threes? how many fives?

Fourteen equals how many twos? how many sevens?

Twelve equals how many twos? how many threes? how many fours? how many sixes?

CHAPTER XX.

TENS.

§ 42. TENS.

Take two tens. Who knows how many two tens are?

Take three tens. How many are three tens?

Take four tens. How many are four tens?

Show me fifty. How many tens make fifty?

Show me sixty. How many tens make sixty?

Read the number I show you. (Seventy. Forty. Eighty. Thirty. Ninety.)

In thirty, how many tens? In fifty, how many tens? In sixty, how many tens?

Nine tens are how many? Eight tens are how many?

Four tens are how many? Six tens are how many?

Show me with bundles of tens the answers to the questions I ask you:

I have two ten-cent pieces in my hand. How much money have I?

Jennie bought four yards of calico at ten cents a yard. How much did she pay for the calico?

James bought five pounds of sugar at ten cents a pound. How much did he pay for the sugar?

There are eight rows of trees in an orchard, and ten trees in each row. How many trees are in the orchard?

If a baker sells a loaf of bread for ten cents, how much will he receive for nine loaves of bread?

Express the number ten on the board.

Who can express two tens or twenty? three tens or thirty? four tens or forty?

Express fifty; sixty; seventy; eighty; ninety; ten tens or one hundred.

Point to a number that has just two tens in it; that has three tens in it; that has six tens in it; that has five tens in it; that has seven tens in it; that has eight tens in it.

Point to the column of tens. Which number has the least number of tens? which number has the greatest number of tens?

Express on the board the sum of ten and ten.

How many fingers and toes have you, counted together?

If it is ten miles from here to Boston, how far is it to Boston and back?

Express on the board the sum of twenty and ten.

A twenty-dollar bill and a ten-dollar bill are how much money?

If we own twenty hens and ten ducks, how many fowls do we own?

If I am twenty years old, and you are ten years old, what is the sum of our ages?

Express the sum of thirty and ten.

If you have thirty cents, and I give you a ten-cent piece, how much money will you have?

If you read thirty minutes, and write ten minutes, how long a time is required for reading and writing?

Express the sum of forty and ten.

If a barrel holds forty gallons of vinegar, and a cask holds ten gallons, how much will both hold together?

A train ran forty miles the first hour, but, owing to a break in the engine, it ran but ten miles the next hour. How far did the train run in the two hours?

A small broom cost forty cents, and a dust-pan ten cents.

How much did both cost? What part of a dollar is fifty cents?

If I have half a dollar, and you have ten cents, how much money have we together?

If I buy a half-dollar's worth of postage stamps, and ten postal cards at a cent each, how much money do I spend for both?

Express the sum of fifty and ten.

Express the sum of sixty and ten.

If you have sixty cents in your bank, and your father puts in two five-cent pieces, how much money will there be in your bank?

If a gallon of molasses costs sixty cents, and a pound of sugar costs ten cents, how much do both cost?

Express the sum of seventy and ten.

I bought a half-bushel of peaches for seventy cents, and a half-dozen pears for ten cents. How much did I pay for both?

My winter cloak cost seventy dollars, and my hat ten dollars. How much did both together cost?

Express the sum of eighty and ten.

A man had ten hens and eighty chickens. How many hens and chickens had he together?

A man bought a chamber-set for eighty dollars, and a lamp for ten dollars. How much did he pay for both?

Express the sum of ninety and ten.

If you have nine ten-cent pieces, and I give you another ten-cent piece, how much money will you have?

If there were ninety cans on one shelf, and ten on another shelf, how many cans were on both shelves together?

If I buy ninety pounds of fine flour, and ten pounds of Graham flour, how many pounds of flour shall I buy?

We own a clock that is ninety years old. How old will it be in ten years from this time?

I have a piece of money that was coined ninety years ago. How old will it be ten years from now?

Express twenty on the board. Express thirty below it. Two tens and three tens are how many tens? Draw a line, and express the answer. Find the sum of thirty and forty by adding the tens. Find the sum of fifty and forty in the same way. Find the sum of fifty and twenty; of sixty and thirty; of forty and forty; of fifty and fifty; of seventy and twenty; of sixty and twenty; of twenty and thirty; of thirty and thirty; of thirty and fifty; of twenty and forty; of twenty and twenty.

There are twenty quires of paper in a ream. How many quires of paper are there in two reams? in three reams? in four reams? in five reams?

Twenty years is called a *score* of years. How old is a man who is two score years? How old is a man who is four score years?

How many pennies have I if I have half a score of pennies? How many errands has a boy to do if he has half a score of errands to do?

How many children were playing in the school-yard if there were three score of children?

How many weeks are there in two terms of twenty weeks each?

Five twenty-dollar gold pieces are how much money?

Express two times twenty thus :
$$\begin{array}{r} 20 \\ \underline{2} \end{array}$$

Express in a similar way : Three times twenty; four times twenty; five times twenty; twenty times two; twenty times three; twenty times four; twenty times five.

How many days are there in two months of thirty days each?

How many yards of carpeting will be required for three rooms, if each room takes thirty yards?

If a man who is now forty years old lives to be twice as old as he is now, how old will he be?

If I teach school forty weeks a year, how many weeks shall I teach in two years?

If you owe me two half-dollars, how many cents do you owe me?

If cloth is fifty cents a yard, how much will two yards cost?

What will two boxes of paper cost at fifty cents a box?

Express: Two times thirty; three times thirty; two times forty; two times fifty; thirty times two; thirty times three; forty times two; fifty times two.

Take this number work:

$$20 + 10 = \quad 60 + 10 = \quad 3 \times 10 = \quad 7 \times 10 =$$

$$30 + 10 = \quad 70 + 10 = \quad 2 \times 10 = \quad 6 \times 10 =$$

$$40 + 10 = \quad 80 + 10 = \quad 5 \times 10 = \quad 9 \times 10 =$$

$$50 + 10 = \quad 90 + 10 = \quad 4 \times 10 = \quad 8 \times 10 =$$

$$\begin{array}{r} 30 \\ + 40 \\ \hline \end{array} \quad \begin{array}{r} 50 \\ + 20 \\ \hline \end{array} \quad \begin{array}{r} 40 \\ + 40 \\ \hline \end{array} \quad \begin{array}{r} 60 \\ + 20 \\ \hline \end{array}$$

$$\begin{array}{r} 30 \\ + 30 \\ \hline \end{array} \quad \begin{array}{r} 20 \\ + 40 \\ \hline \end{array} \quad \begin{array}{r} 50 \\ + 40 \\ \hline \end{array} \quad \begin{array}{r} 60 \\ + 30 \\ \hline \end{array}$$

$$\begin{array}{r} 50 \\ + 50 \\ \hline \end{array} \quad \begin{array}{r} 20 \\ + 30 \\ \hline \end{array} \quad \begin{array}{r} 30 \\ + 50 \\ \hline \end{array} \quad \begin{array}{r} 70 \\ + 20 \\ \hline \end{array}$$

$$\begin{array}{r} 20 \\ 2 \\ \hline \end{array} \quad \begin{array}{r} 20 \\ 3 \\ \hline \end{array} \quad \begin{array}{r} 20 \\ 4 \\ \hline \end{array} \quad \begin{array}{r} 20 \\ 5 \\ \hline \end{array} \quad \begin{array}{r} 30 \\ 2 \\ \hline \end{array} \quad \begin{array}{r} 30 \\ 3 \\ \hline \end{array} \quad \begin{array}{r} 40 \\ 2 \\ \hline \end{array}$$

I am twenty years old. How old was I ten years ago?

It is now the thirtieth of the month. What day of the month was it ten days ago?

A small peach-tree bore fifty peaches. Ten peaches dropped off before they were ripe. How many peaches stayed on the tree to ripen?

A man had seventy silk circulars in the morning, but sold ten during the day. How many had he left?

A ninety-cent book was sold to me for ten cents under price. How much did I pay for the book?

I gave a dollar bill in payment for some work done at the jeweller's, and received ten cents in change. How much did I pay for the work?

In a flight of stairs there are forty steps. There are ten steps from the floor to the first landing. How many steps from the first landing to the top?

I was away for a visit of sixty days. If I spent ten days in going and returning, how many days had I for my visit?

A church in our town was built eighty years ago. A large white house that stands near it was built ten years afterwards. How many years has the house been built?

Express fifty on the board. Express beneath it thirty. Five tens minus three tens are how many tens? Draw a line and express the answer. Find the difference between fifty and twenty by subtracting the tens. Find the difference between fifty and forty; between fifty and ten; between seventy and thirty; between seventy and twenty; between seventy and fifty; between seventy and forty; between seventy and sixty; between seventy and ten; between sixty and twenty; between sixty and forty; between sixty and ten; between sixty and thirty; between sixty and fifty; between forty and ten; between forty and thirty; between forty and twenty; between eighty and thirty; between eighty and forty; between eighty and

ten; between eighty and twenty; between eighty and fifty; between eighty and seventy; between ninety and thirty; between ninety and sixty; between ninety and twenty; between ninety and seventy.

How many quarts of berries, at ten cents a quart, can be bought for thirty cents? for fifty cents? for seventy cents? for ninety cents?

If there are twenty quires of paper in a ream, how many reams are there in forty quires? in sixty quires? in eighty quires?

If twenty things make a score, how many scores are there in forty? in one hundred?

If thirty days are counted to a month, how many months will sixty days equal? will ninety days equal?

For eighty cents, how many pictures can I have framed at forty cents apiece?

One hundred is how many times twenty? is how many times fifty?

Ninety is how many times thirty?

Sixty is how many times thirty? is how many times twenty?

Eighty is how many times twenty; is how many times forty?

Take this number work :

$20 - 10 =$	$20 \div 10 =$	$20 \div 2 =$	$10 \times 4 =$
$30 - 10 =$	$30 \div 10 =$	$50 \div 5 =$	$10 \times 2 =$
$40 - 10 =$	$60 \div 10 =$	$70 \div 7 =$	$10 \times 3 =$
$50 - 10 =$	$40 \div 10 =$	$30 \div 3 =$	$10 \times 5 =$
$60 - 10 =$	$70 \div 10 =$	$40 \div 4 =$	$10 \times 7 =$
$70 - 10 =$	$50 \div 10 =$	$60 \div 6 =$	$10 \times 9 =$
$80 - 10 =$	$80 \div 10 =$	$80 \div 8 =$	$10 \times 8 =$
$90 - 10 =$	$100 \div 10 =$	$100 \div 10 =$	$10 \times 10 =$

90	90	90	90	90	90
— 30	— 50	— 70	— 60	— 40	— 20
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>

80	80	80	80	80	80
— 30	— 50	— 70	— 60	— 40	— 20
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>

70	70	70	70	70	70
— 30	— 50	— 20	— 40	— 60	— 30
<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>	<u> </u>

If you have two ten-cent pieces and a cent, how much money have you? If your cent were a two-cent piece, how much money would you have? If you had a three-cent piece instead of a one-cent piece, how much money would you have? Suppose you had two two-cent pieces, and the twenty cents, how much money would you have? If you had a five-cent piece and twenty cents, how much money would you have? What part of a dollar would you have? How many cents are twenty cents and two three-cent pieces? twenty cents and three two-cent pieces? twenty cents, a five-cent piece, and a two-cent piece? twenty cents, a five-cent piece, and a three-cent piece? twenty cents and three three-cent pieces?

Express the sum of:

Twenty and one.

Twenty and five.

Twenty and two.

Twenty and seven.

Twenty and six.

Twenty and nine.

Twenty and three.

Twenty and eight.

If twenty and one are twenty-one, how much are thirty and one?

Express :

Thirty and one.	Forty and one.
Thirty and four.	Forty and four.
Thirty and six.	Forty and six.
Thirty and eight.	Forty and eight.
Thirty and five.	Forty and five.
Thirty and nine.	Forty and nine.
Thirty and two.	Forty and two.
Fifty and one.	Sixty and one.
Fifty and two.	Sixty and two.
Fifty and five.	Sixty and six.

In twenty-four how many tens? how many ones besides?
 In thirty-five how many tens and how many ones besides?
 in fifty-seven? in sixty-three? in seventy-four? in eighty-
 nine? in ninety-six? in seventeen? in fifteen? in nineteen?

Write in a column : Thirty-seven ; forty-one ; sixty-three ;
 eighty-five ; fifty-four ; seventy-seven. Show me the column
 of ones ; the column of tens. Which number has the most
 tens?

Copy and complete :

$20 + 3 =$	$10 + 2 =$	$12 - 2 =$	$7 + 10 =$
$20 + 5 =$	$20 + 2 =$	$22 - 2 =$	$17 + 10 =$
$20 + 7 =$	$30 + 2 =$	$32 - 2 =$	$27 + 10 =$
$20 + 9 =$	$40 + 2 =$	$42 - 2 =$	$37 + 10 =$
$30 + 4 =$	$50 + 2 =$	$52 - 2 =$	$47 + 10 =$
$30 + 7 =$	$60 + 2 =$	$62 - 2 =$	$57 + 10 =$
$30 + 2 =$	$70 + 2 =$	$72 - 2 =$	$67 + 10 =$
$40 + 1 =$	$80 + 2 =$	$82 - 2 =$	$77 + 10 =$
$40 + 8 =$	$90 + 2 =$	$92 - 2 =$	$87 + 10 =$
$50 + 4 =$	$10 + 7 =$	$14 - 4 =$	$97 - 10 =$

CHAPTER XXI.

THE NUMBER TWENTY.

§ 43. THE NUMBER TWENTY.

Take twenty. How many tens have you taken ?

Two tens are how many. Express this fact on the board ?

Show me one-half of twenty. What is one-half of twenty ?

Express : One-half of twenty is ten.

If there are twenty pencils on my desk, and half are lead-pencils and half are slate-pencils, how many pencils of each kind are on my desk ?

If there are twenty pins in a row, how many pins are in half of the row ?

I am twenty years old. Who knows some little girl who is half as old as I am ? How old is she ?

Our school term is twenty weeks long. If we have a vacation when half the term is over, how many weeks after the beginning of the term does vacation come ?

Who can express : Twenty divided by ten ?

Give me an example for twenty divided by ten.

Express on the board : Ten and ten are twenty. What two equal numbers make ten ? Write : Five and five under each ten. Read : Ten and ten are twenty, in fives. (Five and five and five and five are twenty.) How many fives are twenty ? Express : Four fives are twenty.

Four five-cent pieces are how much money ?

Four gloves have how many fingers?

A dog has how many toes?

Four pansy blossoms have how many petals?

Four five-cent bunches of envelopes will cost how much?

Into how many fives can twenty be divided? Express this fact.

Give an example for : Twenty divided by five.

What four equal numbers make twenty?

What part of twenty is each of these numbers?

What part of twenty is five?

Express : One-fourth of twenty is five.

I had twenty quires of paper done up in four equal packages. How many quires were in each package?

A little girl who had two dimes spent a fourth of her money for fancy crackers. How much money did she spend?

If I am twenty years old, how old is a little girl who is only one-fourth of my age?

Copy and complete :

$2 \times 10 =$	$20 \div 5 =$	$\times 5 = 20$	$\div 10 = 2$
$20 \div 10 =$	$\frac{1}{4}$ of $20 =$	$\div 5 = 4$	$9 \times = 18$
$\frac{1}{2}$ of $20 =$	$10 + 10 =$	of $20 = 10$	$6 \times = 18$
$4 \times 5 =$	$15 + 5 =$	of $20 = 5$	$5 \times = 15$

$\begin{array}{r} 20 \\ -10 \\ \hline \end{array}$	$\begin{array}{r} 18 \\ -9 \\ \hline \end{array}$	$\begin{array}{r} 16 \\ -8 \\ \hline \end{array}$	$\begin{array}{r} 14 \\ -7 \\ \hline \end{array}$	$\begin{array}{r} 19 \\ -13 \\ \hline \end{array}$	$\begin{array}{r} 17 \\ -12 \\ \hline \end{array}$	$\begin{array}{r} 18 \\ -15 \\ \hline \end{array}$	$\begin{array}{r} 20 \\ -15 \\ \hline \end{array}$
--	---	---	---	--	--	--	--

$\begin{array}{r} 3 \\ 2 \\ 5 \\ 4 \\ 3 \\ \hline \end{array}$	$\begin{array}{r} 4 \\ 3 \\ 2 \\ 3 \\ 6 \\ \hline \end{array}$	$\begin{array}{r} 6 \\ 5 \\ 3 \\ 2 \\ 4 \\ \hline \end{array}$	$\begin{array}{r} 3 \\ 4 \\ 5 \\ 2 \\ 6 \\ \hline \end{array}$
--	--	--	--

Who knows how many fours there are in twenty? Those who do not know must find out with the splints.

Express: Twenty divided by four are five.

How many barges will twenty horses supply if four are required for each barge?

Twenty horse-shoes will shoe how many horses all round?

How many quarts of milk can be bought for twenty cents if each quart costs four cents?

Twenty quarts are how many gallons?

Twenty gills are how many pints?

If you find five fours in twenty, how many fours must you put together to make twenty?

Express: Five fours are twenty.

How many wheels have five wagons?

How many legs have five chairs?

How many sides have five squares?

Five gallons are how many quarts?

Five pints are how many gills?

Five horses wear how many shoes?

How many twos in ten? How many twos in two tens? How many twos in twenty, then?

Express: Twenty divided by two are ten.

If you have twenty cents in two-cent pieces, how many two-cent pieces have you?

Twenty pints are how many quarts?

Twenty half-dollar pieces make how many dollars?

Twenty slate-pencils will cost how much if two can be bought for a cent? Twenty apples will cost how much at the same rate?

How many dozen buttons, at two cents a dozen, can be bought for twenty cents?

If in twenty you find ten twos, how many twos will you take to make twenty?

Ten two-cent pieces are how much money?

Ten boys have how many ears?

Ten boys wear how many shoes? how many mittens?

How much does it cost to send ten letters through the mail, if it costs two cents for each letter?

Ten quarts are how many pints?

Ten dollars are how many half-dollars?

Illustrate these examples, and tell me the answer :

A basket-maker put two handles on each basket. How many handles did he put on ten baskets?

I have two boxes, both the same size. They are three inches in length and two in width. How many inches of gilt paper will it take to bind both boxes around the edge?

I made five gallons of preserves, and put the preserves into quart jars. How many jars did I use?

I have a square garden plot bordered with foliage plants. If there are four on each side, one standing at each corner, how many plants are around the plot?

Make a triangle with dots, putting a dot on each corner, and having three dots on each side. How many dots have you made? Make believe these are trees arranged to form an arbor. How many trees does it take to form a triangle if there are three on each side?

How many trees will it take to form a square, if there are five trees on each side? if there are six trees on each side?

Take this number work :

$20 \div 4 =$	$16 + 4 =$	$\frac{1}{4}$ of 20 =
$5 \times 4 =$	$15 + 5 =$	$5 \times = 20$
$20 \div 2 =$	$18 + 2 =$	$4 \times = 20$
$10 \times 2 =$	$\frac{1}{2}$ of 20 =	$10 \times = 20$

CHAPTER XXII.

THE NUMBER TWENTY-ONE.

§ 44. THE NUMBER TWENTY-ONE.

I have six three-cent pieces; how much money have I?
If you give me another three-cent piece, how much money shall I have? How many three-cent pieces shall I have?
Seven three-cent pieces are how much money then?

Seven oranges at three cents each will cost how much?

In seven yards of rope how many feet of rope?

Seven triangles have together how many sides?

Seven three-cornered hats with a tassel on each corner have together how many tassels?

If it takes three yards of ribbon for one pair of bonnet-strings, how many yards of ribbon will be required for seven pairs of bonnet-strings?

If Willie's hens lay three eggs a day, how many eggs will they lay in a week?

Express: Seven threes are twenty-one.

If you must put seven threes together to make twenty-one, how many threes can you find in twenty-one?

Twenty-one feet of chain are equal to how many yards of chain?

Twenty-one cents will buy how many three-cent pencils?

If I cut a strip of paper that is twenty-one inches long into pieces three inches long, into how many pieces shall I cut the strip of paper?

How many three-cent books can be bought for twenty-one cents?

If the news-boy sells seven papers at three cents apiece, how many cents does he receive for the papers? If he is allowed to keep one cent for each paper he sells, how many cents must he return to his employer? Fourteen and seven then are how many?

How many sevens make fourteen? and since fourteen and seven are twenty-one, how many sevens make twenty-one?

In three weeks how many days?

If there are three groups of stars and seven stars in each group, how many stars are in the three groups?

Three pounds of beef at seven cents a pound will cost how much?

Three pairs of horses at seven hundred dollars a pair will cost how many hundred dollars?

Express: Three sevens are twenty-one.

If three sevens make twenty-one, into how many sevens can twenty-one be divided? Twenty-one cents then will buy how many seven-cent loaves of bread? how many seven-cent copy-books?

If berries are seven cents a quart, how many quarts can be bought for twenty-one cents?

In twenty-one days from to-day I shall go home. How many Sundays before I go home? How many Mondays?

Twenty-one children received stars for singing nicely. Each seven received a different colored star. How many different stars were given out?

Express: Twenty-one divided by seven are three.

What three equal numbers make twenty-one?

What then is one-third of twenty-one?

If twenty-one nuts were divided equally among three boys, how many nuts did each boy receive?

A man who owed twenty-one dollars agreed to pay a third of the debt each month until it was paid. How much money did he pay each month?

If a bicycle will travel twenty-one miles in three hours, at what rate is that per hour?

Express: One-third of twenty-one is seven.

Count by threes to twenty-one.

Count by sevens to twenty-one.

Express: Eighteen and three; four and seven; fourteen and seven; eight and three; twenty-one minus three; eleven minus three; twenty-one minus seven; eleven minus seven.

Fill out:

$7 \times 3 =$	$21 - 7 =$	$\times 3 = 21$	$+ 3 = 21$
$21 \div 3 =$	$21 - 3 =$	$\times 7 = 21$	$+ 7 = 21$
$3 \times 7 =$	$14 + 7 =$	$\div 7 = 3$	$+ 10 = 21$
$21 \div 7 =$	$18 + 3 =$	$\div 3 = 7$	$+ 20 = 21$
$\frac{1}{3}$ of 21 =	$20 + 1 =$	$- 7 = 14$	$- 3 = 18$

Review Exercise.

Cloth that is a yard and a foot wide is how many feet wide?

If a sail cloth is seven yards long, how many feet long is it?

If a ship has twenty-one feet of rope in one line, how many yards long is the line?

How many days in a school week?

How many days in four school weeks?

If a dog has four toes on each foot, how many toes has he altogether?

If a squirrel has five toes on each fore-foot, how many toes have two squirrels on their fore-feet?

If a cat has five toes on each fore-foot, how many toes have two cats on their fore-feet?

A cat has four toes on each hind foot and five toes on each fore-foot. How many toes has she altogether?

If I cut ribbon which is eighteen inches long into pieces six inches long, how many such pieces shall I have?

In twenty-one days how many Sundays? how many Fridays? how many Saturdays?

How many gills in a quart? How many gills in two quarts?

If you go to school nine months in a year, how many months do you go to school in two years?

If one spider has nine eyes, how many eyes have two spiders?

If one parasol has ten ribs, how many ribs have two parasols? three parasols? seven parasols?

Name a number made up of ten and four; of ten and eight; of ten and two; of ten and seven; of four tens and seven; of six tens and six; of seven tens and nine; of nine tens and two; of eight tens and five; of five tens and eight; of three tens and nine; of two tens and one.

If there are three books on one shelf, and five times as many books on another shelf, how many books are on the second shelf?

If I slide down hill ten times, and you slide down hill twice as many times, how many times do you slide down hill?

If I have to walk a fourth of a mile to school, and you have to walk three times as far, what part of a mile do you walk to school?

If you have one-third of a dollar, and I have twice as much money, how many thirds of a dollar do I have?

If a family eats a quarter of a lamb each week for four weeks, how many quarters of lamb does the family eat?

If it takes a sixth of a yard of ribbon to make one loop, how much ribbon will it take for four loops?

If you have one-eighth of a dollar, and I have eight times as much money, how much money do I have?

How many two-cent cakes can you buy for five cents, and how many cents will you have left? for seven cents, and what will you have left? for nine cents? for seventeen cents? for nineteen cents? for twenty-one cents? for twenty-three cents?

How many three-cent pencils can you buy for four cents, and how many cents will you have left? for five cents, and how much will you have left? for eight cents? for eleven cents? for sixteen cents? for nineteen cents? for twenty-three cents?

How many fours and what else make nine? make thirteen? make eighteen? make twenty-one? make twenty-two?

Eleven divided by five gives what answer? Thirteen divided by five gives what answer? Sixteen divided by five? eighteen divided by five? twenty-one divided by five? twenty-three divided by five?

Divide eight by six. Divide by six: nine; ten; eleven; fourteen; sixteen; nineteen; twenty-one; twenty-three.

Copy and complete:

$7 = 3 \times 2 +$	$19 = 6 \times 3 +$	$7 = 1 \times 5 +$
$9 = 4 \times 2 +$	$23 = 7 \times 3 +$	$9 = 1 \times 5 +$
$13 = 6 \times 2 +$	$7 = 1 \times 4 +$	$13 = 2 \times 5 +$
$17 = 8 \times 2 +$	$11 = 2 \times 4 +$	$17 = 3 \times 5 +$
$21 = 10 \times 2 +$	$15 = 3 \times 4 +$	$21 = 4 \times 5 +$
$5 = 1 \times 3 +$	$17 = 4 \times 4 +$	$8 = 1 \times 6 +$
$7 = 2 \times 3 +$	$19 = 4 \times 4 +$	$13 = 2 \times 6 +$
$11 = 3 \times 3 +$	$21 = 5 \times 4 +$	$15 = 2 \times 6 +$

CHAPTER XXIII.

THE NUMBER TWENTY-FOUR.

§ 45. THE NUMBER TWENTY-FOUR.

If I have seven three-cent pieces, how much money do I have? If I earn another three-cent piece, how much money shall I have? Eight three-cent pieces, then, are how much money?

Eight three-cent postage stamps will cost how much? Eight three-cent pencils? Eight oranges at three cents apiece?

Eight clover leaves have how many leaflets?

Eight chestnut burrs contain how many nuts, if there are three nuts in each burr?

Eight yards of curtain-cord are how many feet of curtain-cord?

If a blackboard consists of eight slates, each a yard long, how many feet long is the blackboard?

It takes three yards of cloth to make a jacket. How many yards of cloth are required for eight jackets?

Express: Eight threes are twenty-four.

Who knows into how many threes we can divide twenty-four?

When lemons are three cents apiece, how many lemons can be bought for twenty-four cents?

A stick that is twenty-four feet long can be cut into how many yard-sticks?

A farmer's wife, who has twenty-four pounds of butter to make into balls, puts three pounds in each ball. How many balls of butter does she make?

A market-man measured out twenty-four quarts of berries with a three-quart measure. How many times did he fill the measure?

Express: Twenty-four divided by three are eight.

What eight equal numbers make twenty-four?

What part, then, of twenty-four is three?

If I divide twenty-four apples equally among eight boys, how many apples shall I give to each boy?

A man bought eight chairs for twenty-four dollars. What was the cost of each chair?

I put twenty-four pears away in the drawer to ripen, but an eighth of the number decayed. How many decayed?

This line is twenty-four inches long. How long is one-eighth of the line?

There are twenty-four hours in a day. How long is one-eighth of the day?

Jennie has twenty-four examples to do. When she has done three, what part of the number has she done?

Express: One-eighth of twenty-four is three.

Five fours are how many? Another four will make how many? How many fours make twenty-four, then?

Six squares have how many corners?

Six horses have how many legs?

Six dogs have how many legs?

Six gallons of oysters are how many quarts of oysters?

Six four-quart pails will hold how many quarts of syrup?

Six pints of yeast are equal to how many gills of yeast?

I bought six yards of silk at four dollars a yard. How much did I pay for the silk?

My little brother is four years old. I am six times as old as he. How old am I?

It is four miles to Newtown, and six times as far to Oldtown. How far is it to Oldtown?

Express : Six fours are twenty-four.

A chair-maker turned out twenty-four chair legs. How many chairs would they supply ?

In twenty-four gills how many pints ?

In twenty-four quarts how many gallons ?

There were twenty-four buttons on a card, four in each row. How many rows of buttons were there ?

Here are twenty-four splints of equal length. How many separate squares can you form from them ?

Express : Twenty-four divided by four are six.

What *six* equal numbers make twenty-four ?

What, then, is one-sixth of twenty-four ?

If you have twenty-four buttons, and use a sixth of them for your boot, how many buttons do you use ? How many buttons will you have left ?

A man who owned twenty-four acres of land planted one-sixth of it with potatoes. How many acres of potatoes did he plant ?

He planted another sixth of the land with corn. How many acres of corn had he ?

If you earn twenty-four cents a week, what do you earn in a day.

The cook used twenty-four eggs in making six loaves of cake. How many eggs did she use for each loaf ?

Express : One-sixth of twenty-four is four.

Give me a story for any fact in twenty-four which you have learned.

Tell me the answer as I point to each blank : —

$8 \times 3 =$	$6 \times 4 =$	$20 +$	$= 24$	$24 -$	$= 20$
$24 \div 3 =$	$24 \div 4 =$	$21 +$	$= 24$	$24 -$	$= 18$
$\frac{1}{2}$ of 24 =	$\frac{1}{3}$ of 24 =	$18 +$	$= 24$	$24 -$	$= 21$

Three sixes are how many? Another six will make how many? How many sixes make twenty-four?

How many dollars will a man earn in four weeks, if he earns a dollar a day?

* If you go to school six days in a week, how many days will you go to school in four weeks?

How many links in a chain that is four feet long, if there are six links in each foot of the chain?

What will four car-fares cost at six cents a fare?

If six persons can sit on one settee, how many persons can sit on four settees?

Express: Four sixes are twenty-four.

Who has a story for twenty-four divided by six?

If eggs are packed in layers of half a dozen each, how many layers will twenty-four eggs make?

How many quarts of milk at six cents a quart can be bought for twenty-four cents?

How many window draperies can be made from twenty-four yards of goods, if six yards are required for one window?

Express: Twenty-four divided by six are four.

If twenty-four is divided into four equal groups, how many are in each group? What part of twenty-four is each group? What is one-fourth of twenty-four?

If four oranges cost twenty-four cents, what will one orange cost?

If four lamp-chimneys cost twenty-four cents, what will one lamp-chimney cost?

A boy who had twenty-four cents spent a fourth of his money for a balloon. How much money had he left?

There are twenty-four hours in a day. How many hours in a fourth of the day?

If the time between breakfast and dinner is a fourth of the day, how many hours is it between breakfast and dinner?

If I am in school a fourth of the day, how many hours am I in school?

If papa goes to work at seven o'clock, and comes home at one o'clock, what part of the day has he been at work?

There are twenty-four sheets of paper in a quire of paper. How many sheets in a quarter of a quire? If paper is twenty-four cents a quire, what will a sheet of paper cost? What will a fourth of a quire cost?

A quire of paper is usually put up in four equal lots. How many sheets of paper in each lot?

Express: One-fourth of twenty-four is six.

Write: Twenty-four sheets of paper make a quire of paper.

Which are more, eight threes or three eights? Eight threes are how many? Then three eights are how many?

Six fours are equal to how many eights? Six fours are how many? Then three eights are how many?

Who has an example for: Three eights are twenty-four?

Three oxen wear how many shoes?

Three hens have how many toes?

How many wheels have three passenger-cars?

Three pairs of horses need shoeing all round. How many shoes will be required to shoe them?

Express: Three eights are twenty-four.

If you should arrange twenty-four books on a book-case, putting eight books on each shelf, how many shelves would it take?

Twenty-four cents will buy how many loaves of bread at eight cents a loaf? How many yards of cambric at eight cents a yard?

Twenty-four quarts of molasses will fill how many two-gallon jugs?

Twenty-four gills of jelly will make how many quarts of jelly?

Express: Twenty-four divided by eight are three.

What three equal numbers make twenty-four?

What then is one-third of twenty-four?

A boy who had twenty-four brackets for sale, sold one-third of them. How many did he sell?

There were twenty-four spoons in the spoon-holder. We used a third of them at tea. How many spoons remained in the spoon-holder?

I had a quire of paper, but have used a third of it. How many sheets have I used?

Allen sleeps a third of the day, works a third of the day, and spends the rest of his time in amusement. How many hours has he for amusement?

Express: One-third of twenty-four is eight.

Take this number work:

$24 \div 8 =$	$3 \times 8 =$	$24 - 3 =$
$3 \times 8 =$	$8 \times 3 =$	$24 - 4 =$
$\frac{1}{3}$ of 24 =	$4 \times 6 =$	$24 - 6 =$
$24 \div 6 =$	$6 \times 4 =$	$24 - 8 =$
$4 \times 6 =$	$24 \div 3 =$	$8 \times \quad = 24$
$\frac{1}{4}$ of 24 =	$24 \div 8 =$	$6 \times \quad = 24$
$24 \div 4 =$	$24 \div 4 =$	$3 \times \quad = 24$
$6 \times 4 =$	$24 \div 6 =$	$4 \times \quad = 24$
$\frac{1}{6}$ of 24 =	$10 + 4 =$	$24 \div \quad = 3$
$24 \div 3 =$	$20 + 4 =$	$24 \div \quad = 4$
$8 \times 3 =$	$11 + 3 =$	$24 \div \quad = 6$
$\frac{1}{8}$ of 24 =	$21 + 3 =$	$24 \div \quad = 8$
$\frac{1}{3}$ of 24 =	$8 + 6 =$	of 24 = 6
$\frac{1}{4}$ of 24 =	$18 + 6 =$	of 24 = 4
$\frac{1}{6}$ of 24 =	$6 + 8 =$	of 24 = 3
$\frac{1}{8}$ of 24 =	$16 + 8 =$	of 24 = 8

24	24	24	14	24	14
— 10	— 12	— 8	— 8	— 6	— 6
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>
3	4	3	2	3	4
4	5	3	2	8	4
6	4	8	6	3	3
3	3	4	5	4	4
7	8	6	7	5	9
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>

One-fifth.

Into how many parts have I cut the circle? (Five.) How do the parts compare in size? (Equal.) Who knows what part of the whole circle each one of these five equal parts is? Show me then one-fifth of the circle.

You may draw a line on the board, and divide it into fifths.

Divide this triangle into fifths by drawing lines from the vertex to the base.

What number can you divide into fifths and have *one* for each fifth? What number can you divide and have *two* for each fifth? What number has *three* in each fifth? What five equal numbers make twenty? Then what is one-fifth of twenty?

If I give you two two-cent pieces, and tell you that is one-fifth of the money I have, can you tell me how much money I have? Suppose I give you a three-cent piece, and tell you *that* is one-fifth of the money I have; can you tell me how much money I have?

Two is one-fifth of what number?

How many fifths make a whole?

CHAPTER XXIV.

THE NUMBER TWENTY-FIVE.

§ 46. THE NUMBER TWENTY-FIVE.

Twenty and five are how many? How many fives make twenty? Twenty and five then are how many fives?

Express: Five fives are twenty-five.

How many school-days in five weeks?

How many fingers have five gloves?

Five bureaus, with five drawers in each bureau, have how many drawers together?

How many feet of linen must I buy for five window-shades if each shade must be five feet long?

Each think of an example for: Five times five are twenty-five.

Each think of an example for: Twenty-five divided by five.

What is one of the five equal numbers which make twenty-five? What part of twenty-five is five?

If I had a quarter of a dollar, and you had one-fifth as much money, what piece of money would you have? If you had two-fifths as much money, what piece of money would you have? If you had three-fifths as much money, what two pieces of money would you have? If you had four five-cent pieces, what part of my quarter of a dollar would you have?

How many five-cent pieces must you have to equal my quarter?

Give an example for: One-fifth of twenty-five is five.

Express: One-fifth of twenty-five is five.

Tell me what number is needed in each blank:

$5 \times 5 =$	$\frac{1}{5}$ of 20 =	$\frac{1}{5} + \frac{1}{5} =$
$25 \div 5 =$	$\frac{1}{5}$ of 15 =	$\frac{2}{5} + \frac{1}{5} =$
$\frac{1}{5}$ of 25 =	$\frac{1}{5}$ of 10 =	$\frac{2}{5} + \frac{2}{5} =$

Exercise for Review.

How many pints in a quart? How many pints in two quarts? four quarts? six quarts? eight quarts? ten quarts? eleven quarts? twelve quarts?

Eleven two-cent pieces are how much money? Eleven pairs of scissors have how many blades? Eleven sheets of paper have how many leaves? Eleven books have how many covers?

Express: Eleven twos are twenty-two.

Here are some blocks, each two inches thick. If eleven blocks are piled up, one top of the other, how high will the pile be?

This stick is two feet long. Eleven such sticks placed end to end would extend how many feet? How many yards? Twelve sticks placed end to end would extend how many feet? how many yards?

Twelve two-cent pieces are how much money? Twelve two-cent rolls of lozenges will cost how much money?

Express: Twelve twos are twenty-four.

Who has a story for twelve twos?

Express:

Once two.	Five twos.	Nine twos.
Two twos.	Six twos.	Ten twos.
Three twos.	Seven twos.	Eleven twos.
Four twos.	Eight twos.	Twelve twos.

We call this the *Table of Twos*.

Read the table of twos.

How many gills in a pint? in two pints? in three pints?
in four pints? in five pints? in six pints?

How many quarts in a gallon? in three gallons? in five
gallons? in six gallons?

Write: 4 gills = 1 pint.
 2 pints = 1 quart.
 4 quarts = 1 gallon.

This is the *Table of Liquid Measure*.

Read the Table of Liquid Measure.

How many things are in a dozen? in half a dozen? in a
dozen and a half? in two dozen?

Two dozen eggs are how many eggs? Two dozen apples
are how many apples?

Express: Two twelves are twenty-four.

How many months in a year?

How many months in two years?

How many months in a year and a half?

How many sheets of paper in a quire of paper? In half
a quire?

Express: One-half of twenty-four is twelve.

How many hours in a day?

How many hours in half a day?

How many inches equal a foot?

How many inches in two feet?

If velvet is twenty-four inches wide, what is half its
width? How many feet wide is the velvet?

Twenty-four oranges are how many dozen oranges?

Twenty-four months are how many years?

Express: Twenty-four divided by twelve are two.

How many feet in a yard? in three yards? in five
yards? in six yards? in seven yards? in eight yards?

How many strips of carpeting a yard wide will be required to go across a room twenty-four feet long?

How many working days in a week? in two weeks? in three weeks? in four weeks?

A man picking up apples takes up a dozen at once. When he has picked up twenty-four apples, how many handfuls has he picked up?

The hour-hand goes half way round the clock every six hours. How many times does it go half way round the clock in twenty-four hours?

How many gills in a quart? in two quarts? in three quarts?

If I have three quarts of jelly, how many glasses, each holding a gill, can I fill?

If it takes five bottles of wine to make a gallon of wine, how many bottles will it take to make five gallons of wine?

A five-sided figure is five inches on each side. How many inches is it round the figure?

If a term of school is ten weeks, how many school days in half the term?

For twenty-five cents, how many bananas at five cents apiece can I buy?

Mary has ten cents, Susie has eight cents, and Annie has seven cents. If they put their money together, how many bags of peanuts at five cents a bag can they buy?

If five yards of cambric cost twenty-five cents, what does one yard cost?

A man caught twenty-five fish. His little boy caught a fifth as many fish. How many did the boy catch?

A train of cars runs twenty-five miles an hour. A man walks one-fifth as far. How many miles does the man go in an hour?

CHAPTER XXV.

THE NUMBER TWENTY-SEVEN.

§ 47. THE NUMBER TWENTY-SEVEN.

Four and three are how many?

Fourteen and three are how many?

Twenty-four and three are how many?

Eight threes and what number make twenty-seven?

Then nine threes make what number?

Express: Nine threes are twenty-seven.

Nine three-cent pieces are how much money?

Nine three-cent pencils cost how much?

Nine triangles have how many sides?

Nine yards of chain are how many feet of chain?

Johnny is three years old. His papa is nine times as old. How old is his papa?

Here are twenty-seven short sticks. How many separate triangles can you form with them?

A chair-maker put three bars across the back of each chair. How many chairs would twenty-seven bars supply?

Twenty-seven feet of rope are how many yards of rope?

In each season there are three months. How many seasons are there in twenty-seven months?

A man who worked on a farm received three dollars a week. How many weeks did he work to earn twenty-seven dollars?

Express: Twenty-seven divided by three are nine.

Which is more, nine threes or three nines?

If, then, nine threes are twenty-seven, how much are three nines?

If there are nine school-months in a year, how many school-months in three years?

Three pounds of beef at nine cents a pound will cost how much?

Three yards of cambric at nine cents a yard will cost how much?

I can buy crackers at nine cents a dozen. How many dozen can I buy for twenty-seven cents?

How many quires of paper at nine cents a quire can I buy for twenty-seven cents?

What part of twenty-seven is nine?

If I divide twenty-seven plums equally among three children, how many plums shall I give to each?

If three pounds of dates cost twenty-seven cents, what does one pound cost?

If it takes a man twenty-seven days to lay a certain amount of pipe, how long will it take him to lay one-third as much pipe?

If it takes one man twenty-seven days to do a piece of work, how long will it take three men?

Read, and give the answers:

$9 \times 3 =$	$3 \times \quad = 27$	$\times 9 = 27$
$27 \div 3 =$	$9 \times \quad = 27$	$\div 9 = 3$
$3 \times 9 =$	$27 \div \quad = 3$	$\times 3 = 27$
$27 \div 9 =$	$27 \div \quad = 9$	$\div 3 = 9$
$\frac{1}{3}$ of 27 =	$18 + \quad = 27$	$+ 9 = 27$
$24 + 3 =$	$3 + \quad = 27$	$+ 24 = 27$
3 9 18 27 27 27 27 27		
9 3 + 9 - 9 - 3 - 10 - 20 - 7		
<u> </u>	<u> </u>	<u> </u>

Exercise for Review.

How many in a half-dozen? How many in two half-dozens? Which is more, two half-dozens or one dozen?

How many months in half a year? How many months in two halves of a year? Which is the longer time, two halves of a year or a whole year?

How many sheets of paper in half a quire? In two halves of a quire? Which is more, two halves or a whole?

How many halves in a whole?

How many inches in a third of a foot? How many inches in three-thirds of a foot?

How many eggs in a third of a dozen? In three-thirds of a dozen? Which is more, three-thirds of a dozen or a whole dozen?

How many hours in a third of a day? In three-thirds of a day? Which is the longer time, three-thirds of a day or a whole day?

How many thirds in a whole?

How many sheets of paper in a fourth of a quire? In four-fourths of a quire? Which is more, four-fourths of a quire or a whole quire?

How many months in a fourth of a year? In four-fourths of a year? Which is longer, four-fourths of a year or a whole year?

How many fourths in a whole?

Express: One-half of twelve is *six*.

One-third of twelve is *four*.

One-fourth of twelve is *three*.

One-sixth of twelve is *two*.

Which is most, one-half, one-third, one-fourth, or one-sixth of twelve? Which is least, one-half, one-third, one-fourth, or one-sixth of twelve? Which is more, one-third or one-fourth of twelve?

Express : One-half of twenty-four is twelve.

One-third of twenty-four is eight.

One-fourth of twenty-four is six.

One-sixth of twenty-four is four.

One-eighth of twenty-four is three.

Which is most, one-half, one-third, one-fourth, one-sixth, or one-eighth of twenty-four? Which is least, one-half, one-third, one-fourth, one-sixth, or one-eighth of twenty-four? Which is more, one-third or one-sixth of twenty-four?

Which is more, one-half of sixteen or one-eighth of sixteen? One-half of eighteen or one-sixth of eighteen? One-third of eighteen or one-sixth of eighteen?

Which is more, one-half of anything or one-third of the same thing? One-half or one-fourth? One-half or one-sixth? One-half or one-eighth? One-third or one-fourth? One-third or one-sixth? One-sixth or one-eighth?

Here is a large cube cut up into eight small cubes. How do the small cubes compare in size? (Equal.) Show me one-half of the cube. Show me one-fourth of the cube. How many fourths of the cube can you find in one-half the cube?

How many fourths of an apple does it take to equal one-half of an apple? How many fourths of an orange to equal half an orange?

One-half of a dollar equals how many fourths of a dollar? One-half of a day equals how many fourths of a day?

Write : One-half equals two-fourths. ($\frac{1}{2} = \frac{2}{4}$.)

Read and give the answers : —

$\frac{1}{4} + \frac{1}{4} = \frac{2}{4}$	$\frac{3}{4} - \frac{1}{4} = \frac{2}{4}$	$1 - \frac{1}{2} = \frac{2}{4}$	$\frac{2}{8} + \frac{1}{8} = ?$
$\frac{1}{2} - \frac{1}{4} = \frac{2}{4}$	$\frac{3}{4} + \frac{1}{4} = ?$	$1 - \frac{3}{8} = \frac{2}{4}$	$\frac{3}{4} + \frac{1}{4} = ?$
$\frac{1}{2} + \frac{1}{4} = \frac{3}{4}$	$1 - \frac{1}{4} = \frac{3}{4}$	$1 - \frac{4}{8} = \frac{2}{4}$	$\frac{5}{6} + \frac{1}{6} = ?$
$\frac{3}{4} - \frac{1}{2} = \frac{2}{4}$	$1 - \frac{3}{4} = \frac{2}{4}$	$1 - \frac{2}{8} = \frac{3}{8}$	$\frac{7}{8} + \frac{1}{8} = ?$

Look at this divided cube again. Into how many small cubes is it divided? (Eight.) How do the small cubes compare in size? (Equal.) Show me half of the cube. Show me one-eighth of the cube. How many eighths of the cube can you find in a half of the cube?

Here is a circle. Tell me into what it is divided. (Eighths.) Show me one-half of the circle. Show me one-eighth of the circle. How many eighths of the circle can you find in one-half of the circle?

Here is a square marked off on the board. Into what is it divided by the lines that I have drawn through it? (Eighths.) Show me half of the square. Show me one-eighth of the square. How many eighths of the square can you find in half of the square?

One-half of a pie equals how many eighths of the pie?

One half of a dollar equals how many eighths of a dollar?

Write: One-half equals four-eighths.

Copy and complete:

$$\begin{array}{llll} \frac{2}{8} + \frac{2}{8} = \frac{4}{8} & \frac{1}{2} + \frac{2}{8} = \frac{6}{8} & \frac{1}{2} + \frac{3}{8} = \frac{7}{8} & \frac{1}{2} - \frac{1}{8} = \frac{4}{8} \\ \frac{1}{2} - \frac{2}{8} = \frac{2}{8} & \frac{1}{2} + \frac{1}{8} = \frac{5}{8} & \frac{1}{2} + \frac{4}{8} = ? & \frac{1}{2} - \frac{3}{8} = \frac{1}{8} \end{array}$$

You may take the divided cube and find how many eighths of the cube there are in a fourth of the cube.

Here is an apple that is divided. Find how many eighths of the apple it takes to make a fourth of the apple.

Here is a circle that is divided. How many eighths of the circle equal a fourth of the circle?

How many eighths of an orange must you have to equal my fourth of an orange?

How many eighths of a mile equal one-fourth of a mile?

Write: One-fourth equals two-eighths.

Copy and complete:—

$$\begin{array}{llll} \frac{1}{8} + \frac{1}{8} = \frac{2}{8} & \frac{1}{2} = \frac{4}{8} & \frac{1}{4} = \frac{2}{8} & \frac{1}{2} + \frac{1}{4} = \frac{3}{4} \\ \frac{1}{4} - \frac{1}{8} = \frac{1}{8} & \frac{1}{2} = \frac{4}{8} & \frac{2}{8} = \frac{1}{4} & \frac{1}{2} + \frac{1}{8} = \frac{5}{8} \end{array}$$

CHAPTER XXVI.

THE NUMBER TWENTY-EIGHT.

§ 48. THE NUMBER TWENTY-EIGHT.

Four and four are how many?

Fourteen and four are how many?

Twenty-four and four are how many?

Six fours and four are how many?

Seven fours then are how many?

Seven chairs have how many legs?

Seven wagons have how many wheels?

If a cask holds seven gallons, how many quarts does it hold?

If a pail holds seven pints, how many gills does it hold?

A sheet of note paper has four pages. Seven sheets of note paper have how many pages?

If there are four panes of glass in one window, how many panes of glass are there in seven windows?

Seven yokes of oxen have how many horns?

Twenty-eight horse-shoes will shoe how many horses all round?

Twenty-eight horses will supply how many four-horse barges?

How many oranges at four cents apiece can be bought for twenty-eight cents?

In twenty-eight weeks how many moons, if there is a moon every four weeks?

One and seven are how many?

Eleven and seven are how many?

Twenty-one and seven are how many?

Three sevens and seven are how many?

Four sevens are how many?

In four weeks how many days?

Four quarts of peanuts at seven cents a quart will cost how much?

Give me an example for: Four sevens are twenty-eight.

There are twenty-eight days in the month of February. How many weeks are there in February?

If a horse travels seven miles an hour, how many hours will it take him to travel twenty-eight miles?

Twenty-eight dollars will buy how many pairs of boots at seven dollars a pair?

Two dozen and a third of a dozen eggs are packed in layers of seven each. How many layers are there?

A little mill-sweeper earns seven cents every half-day. How many days must he work to earn twenty-eight cents?

What is one-fourth of twenty-eight?

If I have a quarter of a dollar and a three-cent piece, and you have a fourth as much money as I, how much money have you?

There were twenty-eight days in February. Three-fourths of the days were stormy. How many days were stormy?

If there are twenty-eight slats in a blind, how many slats are there in three-fourths of the blind?

In a long ladder there were twenty-eight rounds, but a fourth of the rounds got broken. How many rounds were there then in the ladder?

If I cut a stick of wood which is two feet and four inches long into sticks each seven inches long, how many sticks shall I make? How many cuts shall I make?

What numbers shall I need for these blanks?

$7 \times 4 =$	$21 + 7 =$	$28 \div = 4$
$28 \div 4 =$	$14 + 14 =$	$28 \div = 7$
$4 \times 7 =$	$24 + 4 =$	$4 \times = 28$
$28 \div 7 =$	$20 + 8 =$	$7 \times = 28$
$\frac{1}{4}$ of 28 =	$18 + 10 =$	$14 + = 28$

28	28	28	28	28	28
$- 7$	$- 21$	$- 4$	$- 24$	$- 10$	14
<hr/>	<hr/>	<hr/>	<hr/>	<hr/>	<hr/>

Exercise for Review.

Count by twos to twenty-eight.

Count by threes to twenty-seven.

Count by fours to twenty-eight.

Count by fives to twenty-five.

Count by sixes to twenty-four.

Count by sevens to twenty-eight.

Count by eights to twenty-four.

Count by nines to twenty-seven.

Count by tens to one hundred.

How many dozen and what part of a dozen bananas are there in a bunch of twenty-eight bananas?

How many score and how many more chickens have I, if I have twenty-eight chickens?

How many quarts and what part of a quart of jelly in twenty-eight gills?

How many gallons of oil in a tank containing twenty-eight quarts?

How many years and what part of a year in twenty-eight months?

How many days and what part of a day in twenty-eight hours?

How many yards and how many feet besides in twenty-eight feet of rope?

Twenty-eight cents will buy how many two-cent postage stamps? How many three-cent pencils and what will remain? How many yards of curtain-cord at four cents a yard? How many dozen peaches at five cents a dozen, and what will remain? How many quires of paper at six cents a quire, and what will remain? How many cakes of maple sugar at seven cents a cake? How many quarts of blueberries at eight cents a quart, and what will remain? How many pounds of crackers at nine cents a pound, and what will remain? How many loaves of bread at ten cents a loaf, and what will remain? How many dozen pens at eleven cents a dozen, and what will remain?

If a boy works every day in the week and earns a half-dollar a day, how many weeks must he work to earn twenty-seven dollars?

If I pay ten cents for a bottle of ink which holds a gill, and fifty cents for a quart bottle of ink, how much do I save in buying ink by the quart?

If you sleep one-third of the day and I sleep one-fourth of the day, who sleeps the more hours? How many more hours?

If John eats a half-dozen peaches and Mary eats a quarter of a dozen, who eats the more peaches? How many more?

If I write a third of the day to-day, and a sixth of the day to-morrow, how many more hours shall I write to-day than to-morrow?

Which is the larger part, a half of an apple or a third of the same apple? A half of a stick of candy or a third of the same stick of candy?

Into how many parts will you divide anything to divide it into halves? to divide it into thirds? to divide it into fourths? to divide it into fifths? into sixths? into eighths?

CHAPTER XXVII.

THE NUMBER THIRTY.

§ 49. THE NUMBER THIRTY.

Twenty-five and five are how many?

Five fives and five are how many?

Six fives are how many?

Six bunches of envelopes at five cents a bunch will cost how much?

If you have five cents and I have six times as much, how much money do I have?

Annie is five years old and her mamma is six times as old. How old is her mamma?

Thirty cents will buy how many bananas at five cents apiece?

In thirty school-days how many weeks of school?

A garden is thirty feet long and five feet broad; how many times its breadth is its length?

Nellie's little reading-book has thirty pages. If she reads five pages a week, in how many weeks will she finish the reader?

What is one of the six equal numbers into which thirty can be divided? What number then is one-sixth of thirty?

What piece of money is one-sixth of thirty cents?

If six bottles of ink cost thirty cents, what does one bottle cost?

If six spools of thread cost thirty cents, what does one spool cost?

James found five eggs early in the morning; but that was only one-sixth of the number he found before night. How many did he find in all?

Express: Six fives are thirty.

Thirty divided by five are six.

One-sixth of thirty is five.

Twenty-four and six are how many?

Twenty-four and six are how many sixes?

How many working days in five weeks?

How many balloons has a man who has five bunches with half a dozen in each bunch?

A ship that makes a voyage every six months will make how many voyages in thirty months?

A boy who earns a cent a day must work how many weeks to earn thirty cents?

A boy who earns six dollars a month must work how many months to earn thirty dollars?

What is one of the five equal numbers which make thirty?

What is one-fifth of thirty?

What two equal pieces of money make one-fifth of thirty?

One-fifth of thirty months is what part of a year?

One-fifth of thirty eggs is what part of a dozen eggs?

One-fourth of a quire of paper is what part of thirty sheets of paper?

One-half a foot is what part of thirty inches?

Read and give the answers:

$\frac{1}{3}$ of 30 =	$\times 5 = 30$	$30 \div = 10$
$\frac{1}{5}$ of 30 =	$\times 3 = 30$	$30 \div = 3$
$\frac{1}{6}$ of 30 =	$\times 6 = 30$	$30 \div = 6$
$30 \div 10 =$	$\times 10 = 30$	$30 \div = 5$
$30 \div 6 =$	of 30 = 10	$30 \div = 15$

$30 \div 5 =$	$\text{of } 30 = 6$	$30 - = 20$
$3 \times 10 =$	$\text{of } 30 = 5$	$30 - = 15$
$5 \times 6 =$	$\text{of } 30 = 15$	$30 - = 24$
$6 \times 5 =$	$+ 6 = 30$	$30 - = 25$
$\begin{array}{r} 30 \\ 2 \\ \hline \end{array}$	$\begin{array}{r} 30 \\ 3 \\ \hline \end{array}$	$\begin{array}{r} 30 \\ -10 \\ \hline \end{array}$
	$\begin{array}{r} 30 \\ -15 \\ \hline \end{array}$	$\begin{array}{r} 30 \\ -20 \\ \hline \end{array}$
		$\begin{array}{r} 30 \\ +40 \\ \hline \end{array}$

Exercise for Review.

When anything is divided into five equal parts, what is each part called? What are four of the parts called?

When anything is divided into seven equal parts, what is each part of the whole? What part of the whole are three parts? four parts? seven parts?

What do you mean by one-eighth of anything? by three-eighths of anything? by two-fifths of anything? by five fifths of anything? by one-sixth of anything?

I have a half a dollar and Annie has a quarter of a dollar. Which has the more money? How much more money have I than Annie?

How many quarters of a dollar does it take to equal half a dollar?

I am in school a quarter of the day. Sadie is in school only one-eighth of the day. How many times as many hours am I in school as Sadie?

There are sixteen ounces in a pound. I have here two weights. One is one-fourth of a pound, the other is one-eighth of a pound. How many times as heavy is one as the other?

I have here a half-pound weight. How many eighth-pound weights will it take to balance the half-pound weight?

One-half of a pound of candy will make how many packages of candy each weighing an eighth of a pound?

How many blocks of chocolate, each weighing an eighth of a pound, must you put together to make a half a pound of chocolate? to make a quarter of a pound of chocolate?

In our climate snow is on the ground a third of the year, and only a sixth of the year is warm summer weather. How many times as much winter as summer have we?

Each loaf of ginger-bread takes a sixth of a dozen eggs. How many loaves of ginger-bread can be made from a third of a dozen eggs?

How many sixths of an apple does it take to equal a third of an apple?

A third of a yard will make how many sixths of a yard?

It snowed four hours to-day; what part of the day has it snowed? If it had snowed twice as many hours of the day, what part of the day would it have snowed?

Nellie ate a third of a pound of dates. If I ate half the quantity she ate, what part of a pound did I eat?

If a third of a pound of maple sugar costs six cents, what will a sixth of a pound cost? what will a half a pound cost?

Take this number-work:

$\frac{1}{2} = \frac{4}{8}$	$\frac{1}{2} + \frac{1}{8} = \frac{5}{8}$	$\frac{1}{2} - \frac{1}{8} = \frac{3}{8}$	$\frac{1}{8} + \frac{1}{8} = \frac{2}{8}$
$\frac{1}{2} = \frac{4}{8}$	$\frac{1}{2} + \frac{1}{4} = \frac{3}{4}$	$\frac{1}{2} - \frac{1}{4} = \frac{1}{4}$	$\frac{1}{6} + \frac{1}{6} = \frac{2}{6}$
$\frac{1}{2} = \frac{4}{8}$	$\frac{1}{2} + \frac{1}{6} = \frac{5}{6}$	$\frac{1}{2} - \frac{1}{6} = \frac{2}{6}$	$\frac{2}{6} + \frac{1}{6} = \frac{3}{6}$
$\frac{1}{4} = \frac{2}{8}$	$\frac{1}{4} + \frac{1}{8} = \frac{3}{8}$	$\frac{1}{4} - \frac{1}{8} = \frac{1}{8}$	$\frac{4}{8} + \frac{4}{8} = ?$
$\frac{1}{8} = \frac{1}{8}$	$\frac{1}{8} + \frac{1}{8} = \frac{2}{8}$	$\frac{1}{8} - \frac{1}{8} = 0$	$\frac{3}{6} + \frac{3}{6} = ?$

What will five pairs of boots cost at five dollars a pair?

On Mamie's fifth birthday she invited five children to visit her; each child invited was five years old. What was the sum of the little folks' ages, counting in Mamie?

In a caravan there were four rows of camels and five camels in each row. How many camels were in the caravan?

A boy received three five-cent pieces for shovelling the snow from a sidewalk. How much money did he receive?

Count by fives as far as you can.

How many fives make thirty? make fifteen? make twenty-five? make twenty?

Count by threes to thirty.

How many threes make twelve? make eighteen? make twenty-four? make fifteen? make thirty? make twenty-one?

Twenty gills of milk will cost how much at four cents a pint?

Twenty-four quarts of wine will cost how much at four dollars a gallon?

In sixteen weeks how many new moons, if there is a new moon every four weeks?

If I have twenty-eight quarters of dollars, how many dollars have I?

Five fours are how many? three fours? six fours? four fours? seven fours?

Count by fours to twenty-eight.

How many faces have two cubes?

How many sides have three boxes?

How many sides has a room, counting the floor and the ceiling? How many sides have four rooms?

In five half-years how many months?

Count by sixes to thirty.

Three cubes have how many corners?

Two pounds of candy will fill how many little bags, if there is an eighth of a pound in each bag?

Count by eights to twenty-four.

In a month of twenty-eight days how many weeks?

There are seven colors in a rainbow. If three rainbows were placed side by side, how many strips of color would there be? How many colors?

Count by sevens to twenty-eight.

Nine inches are a quarter of a yard. A half a yard then is how many inches? Three-quarters of a yard are how many inches?

Count by nines to twenty-seven.

Count by tens as far as you can.

Count by elevens as far as you can.

Two dozen oranges are how many oranges?

Two feet are how many inches?

In two years how many months?

Two cubes have how many edges?

One-half of a pint is how many gills?

One-half a working week is how many days?

One-half of an apple is how many eighths of an apple?

One-half of a dime is how many cents?

One-half of a foot is how many inches?

One-half of fourteen days is how many weeks?

One-half of a pound is how many ounces, if there are sixteen ounces in a pound?

There are eighteen inches in half a yard. If this ruler is half a yard long, how long is half the ruler?

One-half of a score of persons is how many persons?

One-half of twenty-two bonnets is how many bonnets?

One-half of a day is how many hours?

One-half of February is how many days?

One-half of a month which has thirty days is how many days?

One-half of fifty cents is how many cents?

One-third of a year is how many months? One-fourth of a year? One-sixth of a year?

One-third of a day is how many hours? One-fourth of a day? One-sixth of a day? One-eighth of a day?

One-fourth of a score is how many? One-fifth of a score?

One-fifth of a quarter of a dollar is how much?

One-fifth of a month is how many days?

Divide seven by four and tell me the answer. Divide nine by five. Divide sixteen by three; eighteen by four; twenty-one by ten; twenty-four by nine.

Take this number work:

$3 \times 7 =$	$8 \times 3 =$	$\frac{1}{5}$ of 30 =	$\frac{1}{6}$ of 30 =
$7 \times 3 =$	$6 \times 4 =$	$3 \times 9 =$	$\frac{1}{5}$ of 30 =
$21 \div 3 =$	$24 \div 6 =$	$27 \div 3 =$	$\frac{1}{3}$ of 30 =
$21 \div 7 =$	$24 \div 8 =$	$\frac{1}{3}$ of 27 =	$\frac{1}{2}$ of 30 =
$\frac{1}{3}$ of 21 =	$5 \times 5 =$	$4 \times 7 =$	$6 \times 5 =$
$2 \times 11 =$	$\frac{1}{5}$ of 25 =	$28 \div 4 =$	$30 \div 6 =$
$12 \times 2 =$	$\frac{1}{5}$ of 20 =	$\frac{1}{4}$ of 28 =	$30 \div 5 =$

Name the sum of each couple of numbers as I point.

7	4	8	5	9	3	11	4	8	8	7
6	8	5	6	4	10	3	7	7	6	5

See if you can add by couples of numbers when there are several numbers to be added, as in this case: 3

When I point to 5, think of the sum of 2 and 5, or 4
 7. When I point to 6, think of the sum of 2 and 6, or 5
 8, and say, "7 and 8 are 15." When I point to 5, say, 4
 "And 9 are 24." When I point to 3, say, "And 7 are 6
 31." 2

When I point this time, try if you can add quickly 5
 by the couples of numbers, thus: 7, 15, 24, 31. 2

Add these numbers in the same way:

2	5	6	2	10	6	5	6	7
7	2	4	5	4	3	5	6	3
3	6	2	4	3	8	7	5	5
5	1	10	5	4	10	7	3	7

United States Money.

I have two dollars in my purse. Who will express on the board what I have in my purse? (2 dollars.) You are right, but I can express it in another way: \$2.

Express: Three dollars. Seven dollars. Five dollars. Twenty dollars. Twenty-five dollars. Eight dollars. One hundred dollars. Sixty dollars. Forty-seven dollars. Eighty-six dollars.

Read what you have expressed.

What have I expressed? (\$5.) I wish to express five dollars and twenty-five cents. Can you show me how? Ned has it right. We always put the dot between the dollars and cents so the cents shall not get into dollars' place. The dollars are in the highest class, and the little cents don't belong with them.

Read what I have expressed:

\$6.25	\$7.84	\$9.63	\$12.44	\$73.82
\$3.50	\$2.04	\$8.02	\$75.08	\$60.10

Express: Three dollars and twenty-six cents.

Eight dollars and sixty cents.

Twelve dollars and a half.

Sixteen dollars and a quarter.

Thirty dollars and ten cents.

Three dollars and five cents.

Five dollars and three cents.

Twenty dollars and two cents.

Thirty dollars and three cents.

Fifty dollars and five cents.

Dry Measures.

Who has seen wooden measures like these somewhere else? What have you seen measured in any one of them? How much does the smallest measure hold? How much

does the next larger one hold? How many times as much as the first measure will the quart measure hold?

Who knows what the largest measure is called? It is a *peck* measure. If you buy this largest measure full of beans, what quantity will you buy? Name some articles that are sold by the peck.

I have here some beans. Who would like to find how many quarts of beans the peck measure holds? Willie may measure, and Annie may put a mark on the board for every quart he puts into the peck measure.

How many quarts does it take to make a peck?

If a horse eats a half of a peck of oats at a meal, how many quarts of oats does he eat?

If I pick a peck and a half of blueberries, how many quarts of blueberries do I pick?

If you buy two pecks of oats, how many quarts of oats do you buy?

A party of boys went chestnutting and found two pecks and a half. How many quarts of chestnuts did they find?

In three pecks how many quarts?

If the peck measure is a quarter full, how many more quarts will it hold? If it is three-quarters full, how many more quarts will it hold?

If the peck measure is five-eighths full, how many quarts are in the measure?

Express: Two pints are one quart.

Eight quarts are one peck.

In what two ways can you express on the board the addition of twenty and thirty?

In what two ways can you express the subtraction of twenty from thirty?

In what two ways can you express two times thirty?

In what one way can you express thirty divided by six?
 We have another way for this: $6 \overline{)30}$

5

You may express in this new way:

Thirty divided by six.

Twenty divided by five.

Twenty-seven divided by nine.

Twenty-eight divided by seven.

Twenty-eight divided by four.

Twenty-five divided by five.

Twenty-four divided by six.

Twenty-four divided by eight.

Twenty-one divided by seven.

Read what you have expressed.

Take this number work:

$4 \overline{)16}$

$5 \overline{)30}$

$4 \overline{)28}$

$12 \overline{)24}$

$6 \overline{)18}$

$7 \overline{)28}$

$6 \overline{)24}$

$11 \overline{)22}$

$7 \overline{)14}$

$8 \overline{)24}$

$3 \overline{)27}$

$10 \overline{)50}$

CHAPTER XXVIII.

FIRST STEPS IN WRITTEN ARITHMETIC.

§ 50. ADDITION.

When the sum of the units does not exceed nine.

Three men pastured their sheep in the same lot. One man had thirteen sheep in the lot, another had twenty-one, and the other had thirty-four. I want you to find how many sheep were in the lot. Show me with the splints the number thirteen; below it put twenty-one, and below the other two numbers put thirty-four. In thirteen how many ones besides the one ten? In twenty-one how many besides the two tens? In thirty-four how many ones besides the three tens? How many ones altogether? (8.) How many tens in thirteen? in twenty-one? in thirty-four? How many tens altogether? Six tens and eight are how many? Then how many sheep were in the pasture?

NOTE. Let the numbers be shown in tens and ones, the tens being each in a bundle by itself.

Let examples be done in this way until the children can perform the operations in the right order without any suggestions from the teacher. When they can do this, they are ready to transfer their work to the board.

Who can express this example on the board? Willie may express it. All may express it.

Who would like to try one at the board and not use the splints? Those who cannot find the answer on the board may use the splints.

Take this example: A merchant had three pieces of cloth. In one piece were fifteen yards, in another thirty-one, and in the other twenty-three. How many yards of cloth in the three pieces?

Take this: I spent fourteen cents for some sugar, forty-two cents for some tea, and thirty cents for some butter. How many cents did I spend?

Take this: How many hours in a day and a half and ten hours more?

Find the sum of twelve, thirteen, fourteen, and fifty.

Find the sum of twenty-three, twenty, thirty-three, and thirteen.

Find the sum of forty-two, twenty-one, fourteen, and twenty-two.

Find the sum :

32	43	33	25	31	60
21	13	22	30	40	19
23	10	11	10	18	10
12	11	12	13	10	30
10	20	21	11	20	20
—	—	—	—	—	—
43	61	37	55	72	91
25	33	40	31	81	20
31	42	51	60	90	65
50	20	30	81	63	73
70	71	20	70	51	50
—	—	—	—	—	—

§ 51. SUBTRACTION.

When the number in each order of the minuend is greater than the corresponding number in the subtrahend.

I had fifty-seven chickens and sold twenty-four. I want you to find how many chickens I had left. Show me with

the splints the number I had before I sold any. Take out the ones I sold. Take out the tens I sold. How many did I have left?

NOTE. Let the pupils solve many similar problems, and always insist that the difference between the *ones* be found first. When the answer to any example of this kind can be readily determined through the use of objects, let the examples be performed at the board.

Express this example on the board: A man made a journey of sixty-eight miles on horseback. When he had gone forty-five miles, how much farther had he to go?

What number will you subtract first? What next? What is the answer?

Express these examples and find the answers:

A train of cars is seventy-nine minutes going from one station to another. If the train is in motion only sixty-seven minutes, how much time is taken in making stops?

A man who had ninety-six acres in his farm sold twenty-one acres. How many acres did his farm then contain.

There were forty-seven trees in an orchard, but fourteen were cut down. How many remained standing?

Find the difference between seventy-eight and thirty-five.

Find the difference between eighty-nine and fifty-four.

Find the difference between ninety-nine and sixty-six.

Find the difference between eighty-seven and thirty-three.

Find the difference:

98	87	75	69	58	87
— 43	— 34	— 32	— 25	— 15	— 53
—	—	—	—	—	—

99	88	77	97	89	86
— 65	— 53	— 34	— 62	— 66	— 22
—	—	—	—	—	—

§ 52. MULTIPLICATION.

When the multiplier is less than ten, and the product of any order in the multiplicand (unless it be the highest) is less than ten.

It takes twenty-one buttons for one jacket. I want to find how many buttons it will take for four jackets; you may help me. Show me first how many *ones* are required for four jackets, since it takes one for each jacket. Show me next how many *tens* are required for four jackets, since it takes two tens for each jacket. How many buttons in all?

There were two dozen buttons on each card; I want you to find how many there were on two cards. First show how many *ones* on the two cards, since there were four on each card. Next show how many *tens* on two cards, since there were two tens on each card. How many buttons on both cards?

If I have two quires of paper, how many sheets of paper do I have.

How many days are there in four months of thirty-one days each?

There are thirty-two quarts in a bushel. How many quarts in four bushels?

If you go to school twenty-one days in a month, how many days do you go in nine months?

[Give similar examples, and let the product be found with the objects until the pupils can do the work readily. Always require the product of the ones found first. Pass to board work when the objects are no longer needed.]

CHAPTER XXIX.

NUMBERS FROM THIRTY TO FIFTY.

§ 53. THE NUMBER THIRTY-TWO.

Facts to be taught :

8×4	$\frac{1}{8}$ of 32	$32 \div 8$
$32 \div 4$	4×8	$\frac{1}{4}$ of 32

NOTE. Teach each fact by itself, and follow the order indicated above.

Express the work in these examples on the board :—

If I have eight dollars in quarters, how many quarters have I? ($8 \times 4 = 32$.)

Eight gallons are how many quarts? ($8 \times 4 = 32$.)

Thirty-two quarts will fill how many half-peck measures? ($32 \div 4 = 8$.)

I bought 8 pounds of meal for thirty-two cents, what was the meal a pound? ($\frac{1}{8}$ of $32 = 4$.)

If eight horses require thirty-two shoes, how many shoes does each horse require? ($\frac{1}{8}$ of $32 = 4$.)

Four pies each cut into eighths will make how many pieces? ($4 \times 8 = 32$.)

If a man bought thirty-two quarts of cranberries, how many pecks did he buy? ($32 \div 8 = 4$.)

Thirty-two ox-shoes will shoe how many oxen all round? ($32 \div 8 = 4$.)

How many feet in circumference is a wheel which turns around four times in going over thirty-two feet? ($\frac{1}{4}$ of $32 = 8$.)

Ounces in a Pound.

Lift the larger weight. What does it weigh? (A pound.) Find a stone on this table which you think weighs a pound. Test its weight by these scales. Were you right? Try again. Each mention something in this room which weighs a pound.

Mention some things that are bought and sold by the pound.

I have here some smaller weights. What will each of these weigh? (An ounce.) Here is some salt. Put in this paper what you think will weigh an ounce. When the paper of salt feels as heavy as the ounce weight, weigh it and see if it is more or less than an ounce.

Mention some things that are sold by the ounce.

Put the pound weight in one scale-pan, and as many ounces in the other as are required to balance the pound weight.

How many ounces equal a pound?

Express: Sixteen ounces equal one pound.

If I bought four ounces of potassium, what part of a pound did I buy?

If I bought eight ounces of gum arabic, what part of a pound did I buy?

If I bought a fourth of a pound of tea, how many ounces of tea did I buy?

If you bought half of a pound of cheese, how many ounces of cheese did you buy?

I ordered a pound of steak, but the piece brought me weighed a pound and a quarter. How many ounces did it weigh?

I bought a pound and a half of dates. How many ounces did the dates weigh?

I bought two pounds of chocolate. How many ounces did I buy?

§ 54. THE NUMBER THIRTY-FIVE.

Facts to be taught :

7×5	$\frac{1}{7}$ of 35	$35 \div 7$
$35 \div 5$	5×7	$\frac{1}{5}$ of 35

Express on the board :

In seven weeks how many school days? ($7 \times 5 = 35$.)

Seven ounces of potassium at five cents an ounce will cost how much? ($7 \times 5 = 35$.)

For thirty-five cents how many five-cent bunches of envelopes can I buy? ($35 \div 5 = 7$.)

Thirty-five ounces of liquid will fill how many vials, each containing five ounces? ($35 \div 5 = 7$.)

If a boy earns thirty-five dollars in seven months, what does he average to earn a month? ($\frac{1}{7}$ of $35 = 5$.)

If I pay thirty-five cents for seven yards of cambric, what is that a yard? ($\frac{1}{7}$ of $35 = 5$.)

In five weeks how many days? ($5 \times 7 = 35$.)

In thirty-five days how many weeks? ($35 \div 7 = 5$.)

If I pay thirty-five dollars for five weeks' board, what do I pay by the week? ($\frac{1}{5}$ of $35 = 7$.)

Exercise for Review.

Draw two lines of the same length parallel to each other and about an inch apart. Mark one **A** and the other **B**. Divide **A** into fourths and **B** into fifths. Since **A** and **B** are the same length, one-fifth of **B** will be what part of **A**? Compare one-fifth of **A** with one-fourth of **A**, and tell me which is larger.

Which is larger, one-fourth of an apple or one-fifth of the same apple? One-fourth of an orange or one-fifth of the same orange? One-fourth or one-fifth of a dollar?

Find the sum of :

One dollar and four cents.
Four dollars and eleven cents.
Two dollars and ten cents.
Three dollars and two cents.
Three dollars.

Find the sum of :

Four dollars and twenty-three cents.
Two dollars and one cent.
Five dollars and thirty cents.
Three dollars and twenty-five cents.
Five dollars and ten cents.

Find the difference between :

Eight dollars fifty-four cents, and three dollars thirty-two cents.

Nine dollars seventy-eight cents, and four dollars three cents.

Twenty-eight dollars forty cents, and seven dollars twenty cents.

Eighty-nine dollars sixty-eight cents, and forty-seven dollars thirty-five cents.

Seventy-eight dollars ninety-nine cents, and fifty-three dollars twenty-seven cents.

Write the table of Liquid Measure.

Write the table of twos.

Who can write the table of threes?

Two ounces are what part of a pound?

Two pounds are how many ounces?

Four pecks and a half of currants are how many quarts of currants?

Two scores of years are how many years?

Three reams of paper are how many quires of paper?

Four twenty-dollar gold pieces are how much money?

Four twenty-five cent pieces are how much money?

In seventeen, how many tens, and how many ones besides?

In thirteen, how many tens, and how many ones besides?

In fifteen? In nineteen? In twenty-four? In twenty-

seven? In forty? In fifty-three? In seventy-five?

§ 55. THE NUMBER THIRTY-SIX.

Facts to be taught :

12×3	6×6	$\frac{1}{4}$ of 36
$36 \div 3$	$36 \div 6$	3×12
9×4	$\frac{1}{3}$ of 36	$36 \div 12$
$36 \div 4$	4×9	$\frac{1}{3}$ of 36
$\frac{1}{3}$ of 36	$36 \div 9$	$\frac{1}{2}$ of 36

Express on the board :

A side of our room is twelve yards long. How many feet in length is it? ($12 \times 3 = 36$.)

I bought three dozen oranges this morning. How many oranges did I buy? ($3 \times 12 = 36$.)

I have thirty-six cents in three-cent pieces. How many three-cent pieces have I? ($36 \div 3 = 12$.)

I have here a stick which is thirty-six inches long. How many feet in length is the stick? ($36 \div 12 = 3$.)

Nine gallon-jugs will hold how many quarts of vinegar? ($9 \times 4 = 36$.)

At nine cents a quarter, what will a pound of candy cost? ($4 \times 9 = 36$.)

Thirty-six panes of glass will supply how many windows, if it takes four panes for each window? ($36 \div 4 = 9$.)

At nine cents a quire, how many quires of paper can I buy for thirty-six cents? ($36 \div 9 = 4$.)

Six melons, each cut into sixths, will make how many pieces? ($6 \times 6 = 36$.)

Thirty-six eggs will make how many loaves of cake, if a half dozen is required for each loaf? ($36 \div 6 = 6$.)

If you divide a yard of ribbon into three equal parts, how many inches in length is each part? ($\frac{1}{3}$ of $36 = 12$.)

Thirty-six pounds of starch were put into four equal packages. How many pounds were in each package? ($\frac{1}{4}$ of $36 = 9$.)

If six yards of cloth cost thirty-six cents, what is the cloth a yard? ($\frac{1}{6}$ of $36 = 6$.)

If I can buy nine dozen clothes-pins for thirty-six cents, what are they worth a dozen? ($\frac{1}{9}$ of $36 = 4$.)

Exercise for Review.

Some silk, some ribbon, and some ruching together cost thirty-six cents. The silk and the ribbon cost twenty-four cents. The ribbon and the ruching cost eighteen cents. What did each of the articles cost? (Ruching 12 cents, ribbon 6 cents, silk 18 cents.)

We have a flight of stairs consisting of twenty steps. Each step is twelve inches broad and six inches deep. How many yards of carpeting will be required to carpet the stairs? (10 yards.)

How many plants, a foot apart, can be set in two borders, each five yards long? (32.) In three borders, each three yards long? (30.)

If in a winter's day it is dark from half-past four until half-past seven the next morning, how many hours is it from daylight to dark? (9 hours.)

Eddie had a ten-cent piece, three five-cent pieces, a three-cent, and a two-cent piece. He bought a kite for ten cents, and three oranges at five cents apiece. How many cents had he left? (5 cents.)

If a sheet of paper is doubled four times, how many leaves are made? (16.)

A long strip of lead was cut into five strips, each six inches long, and there were three inches of the lead left. How long was the strip of lead? (33 inches.)

A boy who was selling lilies sold five for two cents. How much money did he receive for thirty lilies? (12 cents.) For fifty lilies? (20 cents.)

If two men can lay a wall in thirty days, how long will it take four men to lay the wall? (15 days.) How long will it take six men? (10 days.)

I bought some oranges and some candy for twenty-four cents. The oranges cost twice as much as the candy. How much did the candy cost? (8 cents.)

I have a half of a dollar and John has a quarter of a dollar. What part of a dollar have we together? ($\frac{3}{4}$.)

It will take a fourth of a yard of velvet to face my hat, an eighth of a yard to bind it, and a half of a yard for bows. How much velvet do I need for the hat? ($\frac{7}{8}$.)

It takes a quarter of a yard of satin to make a bag, and an eighth of a yard to face it. How much satin will it take all together? ($\frac{3}{8}$.) What will the satin cost at eighty cents a yard? (30 cents.)

Pecks in a Bushel.

Look at these two measures. What do we call the smaller one? (A peck measure.)

The larger one holds a half-bushel. Measure these oats, and find how many pecks make a half-bushel.

Who can tell how many pecks make a whole bushel?

Write: Four pecks equal a bushel.

What is bought by the bushel?

A half-bushel of potatoes is how many pecks of potatoes?

A bushel of peas is how many pecks of peas?
 A bushel of apples is how many pecks of apples?
 A bushel of nuts is how many pecks of nuts?
 Four bushels are how many pecks?
 Six bushels are how many pecks?
 Nine bushels are how many pecks?
 Eight bushels are how many pecks?
 Seven bushels are how many pecks?
 Ten bushels are how many pecks?
 Five bushels are how many pecks?

§ 56. THE NUMBER FORTY.

Facts to be taught:

$\frac{1}{10}$ of 40	$40 \div 5$	5×8	$\frac{1}{5}$ of 40
8×5	$\frac{1}{8}$ of 40	$40 \div 8$	$\frac{1}{2}$ of 40

Express on the board:

If I can buy ten spools of thread for forty cents, what does one spool cost? ($\frac{1}{10}$ of 40 = 4.)

Eight gloves have how many fingers? ($8 \times 5 = 40$.)

How many dozen peaches, at five cents a dozen, can be bought for forty cents? ($40 \div 5 = 8$.)

If a boy earned forty dollars in eight weeks, how much did he earn in one week? ($\frac{1}{8}$ of 40 = 5.)

If a man works eight hours a day, how many hours will he work in five days? ($5 \times 8 = 40$.)

If a bicycle will go a mile in eight minutes, how many miles will it go in forty minutes? ($40 \div 8 = 5$.)

Susie recites forty lessons a week if she is at school five days in the week. How many lessons does she recite each day? ($\frac{1}{5}$ of 40 = 8.)

I bought forty yards of carpeting, and used one-half of it. How much did I use? ($\frac{1}{2}$ of 40 = 20.)

§ 57. THE NUMBER FORTY-TWO.

Facts to be taught:

7×6	$\frac{1}{7}$ of 42	$42 \div 7$
$42 \div 6$	6×7	$\frac{1}{6}$ of 42

Express on the board:

How many working days are there in seven weeks?
($7 \times 6 = 42$.)

If eggs are packed in layers of half a dozen each, how many layers will forty-two eggs make? ($42 \div 6 = 7$.)

If seven cans will hold forty-two quarts of milk, what will one can hold? ($\frac{1}{7}$ of $42 = 6$.)

In six weeks how many days? ($6 \times 7 = 42$.)

If we use a bag of flour a week, how many bags of flour do we use in forty-two days? ($42 \div 7 = 6$.)

A little boy who works in a mill earns forty-two cents a week. How much does he earn a day? ($\frac{1}{6}$ of $42 = 7$.)

§ 58. THE NUMBER FORTY-FIVE.

Facts to be taught:

9×5	$\frac{1}{9}$ of 45	$45 \div 9$
$45 \div 5$	5×9	$\frac{1}{5}$ of 45

Express on the board:

If a man can paint five pails in an hour, how many pails can he paint in nine hours? ($9 \times 5 = 45$.)

How many weeks will forty-five pounds of butter last a family when five pounds are used a week? ($45 \div 5 = 9$.)

If it takes forty-five pickets for nine gates, how many pickets will it take for one gate? ($\frac{1}{9}$ of $45 = 5$.)

A man set out cabbage plants, nine in a row. How many were there in five rows? ($5 \times 9 = 45$.)

If a dozen silver forks cost nine dollars, how many dozen can be bought for forty-five dollars? ($45 \div 9 = 5$.)

If a newsboy sells forty-five papers, and one-fifth are weeklies and the rest dailies, how many weeklies does he sell? ($\frac{1}{5}$ of 45 = 9.) How many dailies? ($45 - 9 = 36$.)

§ 59. FIRST STEP IN MULTIPLICATION OF FRACTIONS.

If it takes one-third of a yard of lace to trim one sleeve, how many thirds will be required for a pair of sleeves? for two pairs of sleeves?

If a dozen bananas cost a quarter of a dollar, how many quarters will six dozen bananas cost?

If John earns two-fifths of a dollar a day, how many fifths will he earn in a week?

It is three-eighths of a mile to school. If I go over the distance four times a day, how many eighths of a mile shall I walk in a day?

A large family used five-sixths of a pound of sugar every night at supper. How many sixths did the family use in a week? Express this example on the board.

NOTE. If the pupil has any difficulty in expressing examples in which fractions occur, require him to express a similar example in which whole numbers occur, and he will perceive the analogy.

Find the products:

$$\begin{array}{llll}
 2 \times \frac{2}{8} = \frac{4}{8} & 2 \times \frac{4}{9} = \frac{8}{9} & 3 \times \frac{3}{10} = \frac{9}{10} & 3 \times \frac{4}{13} = \frac{12}{13} \\
 4 \times \frac{3}{18} = \frac{12}{18} & 2 \times \frac{5}{11} = \frac{10}{11} & 3 \times \frac{2}{7} = \frac{6}{7} & 3 \times \frac{5}{16} = \frac{15}{16} \\
 3 \times \frac{2}{9} = \frac{6}{9} & 3 \times \frac{8}{11} = \frac{24}{11} & 4 \times \frac{5}{21} = \frac{20}{21} & 4 \times \frac{4}{17} = \frac{16}{17}
 \end{array}$$

§ 60. THE NUMBER FORTY-EIGHT.

Facts to be taught:

$$\begin{array}{lll}
 12 \times 4 & 48 \div 6 & \frac{1}{6} \text{ of } 48 \\
 48 \div 4 & \frac{1}{3} \text{ of } 48 & 4 \times 12 \\
 \frac{1}{12} \text{ of } 48 & 6 \times 8 & 48 \div 12 \\
 8 \times 6 & 48 \div 8 & \frac{1}{4} \text{ of } 48
 \end{array}$$

Express on the board :

Twelve chairs have how many legs? ($12 \times 4 = 48$.)

If it takes four rails for a gate, how many gates will forty-eight rails make? ($48 \div 4 = 12$.)

Forty-eight books were put into twelve equal piles. How many books were in each pile? ($\frac{1}{12}$ of $48 = 4$.)

If one cake of maple sugar weighs six pounds, what will eight cakes weigh? ($8 \times 6 = 48$.)

If six baskets of peaches together hold a peck of peaches, how many pecks of peaches will forty-eight baskets hold? ($48 \div 6 = 8$.)

If eight bunches of envelopes cost forty-eight cents, what does one bunch cost? ($\frac{1}{8}$ of $48 = 6$.)

Six oxen wear how many shoes all together? ($6 \times 8 = 48$.)

How many pecks in forty-eight quarts? ($48 \div 8 = 6$.)

If a boy earns forty-eight cents in six hours, what is that an hour? ($\frac{1}{6}$ of $48 = 8$.)

Four dozen oranges are how many oranges? ($4 \times 12 = 48$.)

In forty-eight inches how many feet? ($48 \div 12 = 4$.)

Forty-eight bunches of matches were put into four equal packages. How many bunches were in each package? ($\frac{1}{4}$ of $48 = 12$.)

§ 61. THE NUMBER FORTY-NINE.

Facts to be taught :

$$7 \times 7 \qquad 49 \div 7 \qquad \frac{1}{7} \text{ of } 49$$

Express on the board :

If I put seven melon seeds in a hill, how many seeds do I put in seven hills? ($7 \times 7 = 49$.)

A cooper has forty-nine feet of hoop iron. If it takes

seven feet for one hoop, how many hoops can he make?
($49 \div 7 = 7$.)

If seven pounds of sugar cost forty-nine cents, what does one pound cost? ($\frac{1}{7}$ of $49 = 7$.)

Exercise for Review.

REMARK. Application of numbers in examples like the following is an important part of the work in Arithmetic. It is not expected that the pupil will solve the problems by himself. He will need to be led by appropriate questions to reason out the result, or by illustration to see the result. Each example is a teaching exercise in itself, and the whole exercise is calculated to teach the pupil how to apply his knowledge of numbers. The exercise is a test exercise only in the sense that it tests knowledge of facts. The examples are not too difficult for this grade of work.

A man who earned thirty dollars a week paid ten dollars a week for board. Another man earned but twenty-five dollars a week, and paid four dollars a week for board. Which one was better off at the end of the week?

A man counting his eggs for market found he had half a hundred. He kept two for his own use, and packed the rest in layers of half a dozen each. How many layers had he?

John earns three dollars a week. If he spends one dollar one week, three dollars the next week, and five the next week, how much money has he left from his three weeks' earnings? What are his average expenses a week?

If I spend ten dollars one week, twelve dollars the next week, and eleven dollars the next week, what are my average expenses per week?

Nellie had thirty pretty buttons and Elsie had ten buttons. Nellie agreed to give Elsie enough buttons so that each should have the same number if Elsie would exchange some of her buttons for Nellie's. How many buttons did Nellie have after she had done as she agreed?

A garden plat nine feet by six feet was bordered by a walk two feet wide. How much farther was it around the outside of the walk than around the garden plat?

While out shopping this morning I spent half the money in my purse. I had five dollars when I returned home. How much money did I spend?

After spending a fourth of her money Annie had twelve cents left. How many cents had she at first?

After Harry had done a third of his examples he had eighteen more to do. How many had he to do all together?

A little girl's car-fare was fifteen cents, and her mamma's was twice as much. How much was the fare for both?

John guessed that a pumpkin weighed ten pounds and four ounces. George guessed it weighed ten pounds and ten ounces. Neither was right, but one was just as nearly right as the other. How much did the pumpkin weigh?

After spending a quarter of a dollar I had three times as much money in my purse as I spent. How much money had I at first?

A wood-sawyer had sticks of wood four feet long which he was to cut into sticks a foot long. How many cuts did he make in sawing a dozen sticks of wood? How many sticks did he make?

I bought eight yards of cloth at six cents a yard, and gave in payment a quarter of a dollar and three ten-cent pieces. How much change ought I to receive?

Susie is fifteen years old and her brother is ten years old. How old was Susie when twice as old as her brother?

Johnnie is five years old and his father is thirty years old. How old will Johnnie be when half as old as his father?

James and his sister went berrying one day. At night, after their berries were picked over, they turned them into some measures to see how many they had. The berries

filled a half-bushel measure, a peck measure, a two-quart measure, a quart measure, and a pint measure. How many quarts of berries had they?

If there was an animal whose number of eyes doubled each year he lived, and who had two eyes to begin with, how many eyes had he in five years?

I got a hundred dollars from the bank in six bills. Two of the bills were ten dollars each. What was each of the other bills if they were each for the same amount?

A man spent six-eighths of what he earned. What part of his earnings had he left? If he had spent seven-ninths of his earnings, what part would he have had left? If he had spent six-sevenths, what part would he have had left?

Two boats are fifty miles apart, and are sailing toward each other. One sails at the rate of six miles an hour, and the other at the rate of four miles an hour. In how many hours will they pass each other?

Two boats are sailing in the same direction and are ten miles apart, but the one that is behind goes two miles an hour faster than the one ahead. How many hours will it take the boat that is behind to make up the ten miles, and so catch up with the other boat?

One man earns two hundred dollars a month, but has work only half of the year. Another man earns a hundred dollars a month, and works every month in the year. How do the earnings of the two men for a year compare?

How many strokes does a clock give in twelve hours?

We have a clock which strikes every hour, and strikes one at quarter past, two at half-past, and three at quarter of the hour. How many strokes does such a clock give from five minutes past twelve to five minutes past six?

How many yards of carpeting a yard wide will be needed to carpet a room five yards long and five yards wide?

How many yards of carpeting a yard wide will it take

to carpet a hallway that is a yard and a half wide and six yards long?

How many yards of cloth half a yard wide will it take to line a box that is a yard long, a half a yard wide, and a half a yard deep?

If a wax-plant doubled its number of blossoms each year, and had two blossoms the first year, how many blossoms had it the seventh year?

If you divide a line into two parts, so that one part shall be twice as large as the other, what fraction of the whole line is each part?

After dividing thirteen by four, what part of four shall I have left?

After dividing fifteen by four, what part of four shall I have left?

After dividing seventeen by three, what part of three shall I have left?

After dividing nineteen by six, what part of six shall I have left? after dividing twenty by six? twenty-two by six? twenty-five by six?

If I divide two apples equally among four boys, what part of an apple shall I give to each?

If you and Susie and I had each three-quarters of a dollar, how many dollars should we have together?

If a boy earned three-quarters of a dollar a day, how much would he earn in a week?

If it takes two-fifths of a yard of ribbon for a bow, how much ribbon will be needed for five bows? for ten bows?

If you put a bushel of apples into four baskets, each holding the same quantity, how many quarts does each basket hold?

My album will hold four pictures on a page. How many pictures will the album hold if there are six leaves in it?

If it takes forty yards of carpeting a yard wide for a room five yards wide, how long is the room?

If sugar that cost seven cents a pound is sold at ten cents a pound, how much is gained on thirteen pounds?

If the material for a dress costs ten dollars, and the trimmings and making cost twice as much, how much does the dress cost?

A man bought an old table for five dollars. He paid two dollars for having it scraped, and sold it for ten dollars. How much did he gain?

A farmer's wife sold four dozen eggs at a quarter of a dollar a dozen, and took her pay in cotton cloth at ten cents a yard. How many yards did she get?

My watch will run from eight o'clock in the morning until twelve o'clock at night the next day. How many hours will my watch run?

If I leave the school-house at five o'clock at night, and am there at half-past eight in the morning, how many hours from the time I leave the school-house until I return?

If a locomotive goes at the rate of two miles in three minutes, how far will it go in fifteen minutes? in twenty-one minutes? in eighteen minutes? in thirty minutes? At the same rate, how long will it take the locomotive to go four miles? eight miles? sixteen miles?

If you make a little book by doubling a piece of paper six times, how many leaves will your book have? How many pages?

If there are fifty pages in a book, what are the two middle pages numbered? If there are fifty leaves in a book, what are the two middle pages numbered?

A boy earned four dollars a week. How much money had he at the end of twelve weeks if he had spent two weeks' earnings?

Four cubes have how many faces? have how many corners? have how many edges?

At the rate of a half-cent for every ounce, how much will it cost to send a package weighing two pounds?

Nellie is three years old the eleventh of September; Johnnie is six years old the seventh of the same month. How much older than Nellie is Johnnie?

Ida is nine years old the ninth of May; Jennie is seventeen years old the ninth of September. How much older than Ida is Jennie?

A man saved thirty-two dollars one month, half as much the next month, and spent eight dollars more than he earned the next month. How much money had he at the end of the three months?

A boy who earned three dollars a week spent two dollars one week, one dollar another week, and a half of a dollar each of two other weeks. How much had he saved at the end of four weeks?

If I draw as large a square as I can in a circle that is twelve inches across, how many inches will it be across the square from corner to corner?

How many square tiles, six inches on a side, can I place around the outside of a hearth that is four feet long and two feet deep? Represent the hearth on the board, and see if you are right. If the tiles were only four inches on a side, how many could I place around the outside?

Henry's hoop is six feet round the outside. If it turns round eight times without tumbling over, how much ground does it pass over?

How many desks, each occupying two feet of room, and placed two feet apart, can be set across a room that is thirty-six feet wide, if the two end desks are each three feet from the wall?

CHAPTER XXX.

PROCESSES IN WRITTEN ARITHMETIC CONTINUED.

§ 62. SECOND STEP IN ADDITION.

When the sum of the ones exceeds nine.

Three boys were counting their money. One boy had a quarter of a dollar, another boy had ten cents more, and the third boy had thirty-eight cents. Let us see how much money they had all together. Show me each of the numbers. What will you do first, Willie? (Find the sum of the ones.) How many ones? (Eighteen.) In eighteen how many tens? Put this rubber band about the ten. Who thinks what to do with this ten? (Put it with our other tens.) How many tens will you then have? How much money had the three boys together?

A farmer sent to market a dozen and a half bushels of potatoes at one time, two dozen bushels at another time, and three dozen bushels at another time. * Let us find how many bushels he sent all together. Of what will you find the sum first, Eddie? (Of the ones.) How many ones? How many tens in *twenty-two*? Put a rubber band about each ten. What will you do with these two tens, Annie? How many tens will you then have? How many bushels of potatoes did the farmer send to market?

NOTE. As soon as the children can readily find the answers to such examples as the above by means of the objects, send them to the board to perform similar examples. Give much practice.

Other steps in addition :

736	1436
254	3798
76	2764
39	1978
<hr/>	<hr/>

§ 63. SECOND STEP IN SUBTRACTION.

When the number in the right-hand order of the minuend is less than the number in the corresponding order of the subtrahend.

There were fifty-two children in a room, but a class of twenty-eight was excused. We want to find how many were left in the room. Show me the number in the room before any left the room. Subtract the number of ones first. How many ones must you subtract? (8.) Who knows where to look for more ones? (Break a bundle of tens.) Yes, break a bundle of tens and put the ten with the ones. Now subtract eight. How many ones have you left? (4.) How many tens must you subtract? (2.) Subtracting the two tens, what number have you left? (24.) How many children then remained in the room?

NOTE. Give similar examples for work with objects until the pupils can readily find the answer. Take care to have the work performed in the right order, viz.: First. Take a ten and unite it with the ones of the minuend. Second. Subtract the given number of ones. Third. Subtract the tens.

Preparatory to passing from work with the objects to work with figures, question the pupil in regard to the order he follows, thus: In finding the difference between seventy-six and thirty-seven, what do you do first? (Take a ten and put it with the ones.) What next? (Subtract seven.) What next? (Subtract three tens.)

Take this example at the board :

A man who had eighty-three chickens sold fifty-nine. How many had he left?

(When the work is completed it will stand on the board in the form shown in the margin. After some practice the pupil will not need to express the "borrowing," but may carry on the work mentally.)

Other steps in subtraction :

$$\begin{array}{r} 350 \\ - 105 \\ \hline \end{array} \qquad \begin{array}{r} 702 \\ - 57 \\ \hline \end{array} \qquad \begin{array}{r} 6000 \\ - 999 \\ \hline \end{array}$$

§ 64. SECOND STEP IN MULTIPLICATION.

When the multiplier consists of one figure, and the product of the number in the lowest order of the multiplicand by the multiplier exceeds nine.

I had a square box that was sixteen inches on a side. I want you to tell me how far it was round the box. What will you find first? (Four sixes.) How many tens in your answer? Put a rubber band about each ten. What will you find next? (Four tens.) What will you do with the two tens you found in twenty-four? (Add them to the four tens.) How many inches round the box? (64.)

(Begin with work on the board as soon as the pupil comprehends that he is to separate the tens from the ones in the product of units by units, and that he is to add these tens to the product of the tens. It is well to have the partial products expressed separately at first, as shown in the work written in the margin. In a short time the pupil will learn to "carry" mentally, and express only the entire product.)

Find the products :

$$\begin{array}{r} 38 \\ 5 \\ \hline 40 \\ 150 \\ \hline 190 \end{array} \qquad \begin{array}{r} 46 \\ 7 \\ \hline \end{array} \qquad \begin{array}{r} 59 \\ 6 \\ \hline \end{array} \qquad \begin{array}{r} 27 \\ 8 \\ \hline \end{array} \qquad \begin{array}{r} 84 \\ 9 \\ \hline \end{array}$$

CHAPTER XXXI.

NUMBERS FROM FIFTY TO SIXTY.

§ 65. THE NUMBER FIFTY-FOUR.

Facts to be taught:

9×6	$\frac{1}{3}$ of 54	$54 \div 9$
$54 \div 6$	6×9	$\frac{1}{6}$ of 54

§ 66. THE NUMBER FIFTY-SIX.

Facts to be taught:

8×7	$\frac{1}{8}$ of 56	$56 \div 8$
$56 \div 7$	7×8	$\frac{1}{7}$ of 56

§ 67. THE NUMBER SIXTY.

Facts to be taught:

12×5	5×12	$\frac{1}{2}$ of 60
$60 \div 5$	$60 \div 12$	$\frac{1}{6}$ of 60
$\frac{1}{12}$ of 60	$\frac{1}{5}$ of 60	$\frac{1}{10}$ of 60

Exercise for Review.

How many months in four years?

Counting four weeks and two days to a month, how many weeks are in a year?

A quire of paper is usually divided into four equal packages. How many sheets of paper are in each package? How many sheets of paper in eight such packages? How many quires?

A man bought six pecks of cranberries. If his family ate a quart a day, how many days did they last?

A cheese which weighed forty-eight pounds was cut into quarters. What did each quarter weigh? What did half of the cheese weigh?

What five equal pieces of money make fifty cents? What ten equal pieces? What two equal pieces? What twenty-five equal pieces? What fifty equal pieces?

Nine flies have how many legs all together?

If it takes a half-dozen eggs to make a loaf of cake, how many eggs will it take to make nine loaves?

If a man works at his trade nine hours a day, how many hours does he work in a week?

If I can buy a ticket and a half for six cents, how many tickets can I buy for fifty-four cents?

A roll of wall-paper fifty-four feet long will make how many strips, if our room is nine feet high?

A chamber-set was valued at fifty-four dollars, but, being damaged, the price was reduced one-sixth. What then was its price?

There were fifty-four pounds of butter in a tub. How much remained when one-ninth of it had been used?

How many school-days in eleven weeks?

If a star-fish has five arms, how many arms have eleven star-fish?

I bought five sticks of braid, each of which lacked one yard of containing a dozen yards. How many yards of braid were in the five sticks together?

Of fifty-five plants which the gardener set out this spring, one-fifth was killed by the frost. How many were killed?

How many days in seven weeks? in eight weeks?

I bought eight yards of cambric at seven cents a yard, and gave in payment a fifty-cent coin and a ten-cent coin. What change ought I to receive?

How long will seven pecks of oats last a horse if he eats seven quarts a day?

A man paid fifty-six cents for peaches, at eight cents a dozen. Two dozen decayed, and he sold the rest at twelve cents a dozen. Did he gain or lose, and how much?

A man bought a chamber-set for fifty-six dollars, and a rocking-chair for one-eighth as much. What did he pay for both together.

A man bought a cooking-range for fifty-six dollars, and a small oil-stove for one-seventh as much. What was the difference in price?

A man who sells shoe-strings at six cents a dozen gains a cent on each dozen? What did twelve dozen cost him?

In five feet how many inches?

In five years how many months?

In five dozen how many things?

If you can buy two apples for five cents, how many apples can you buy for sixty cents?

A newsboy buys eight papers for twelve cents. How many papers will he get for sixty cents? If he sells his papers for two cents apiece, what does he gain on eight papers? on sixteen papers? on twenty-four papers? How many dozen papers must he sell to gain sixty cents?

In sixty school-days how many school-weeks?

If it takes sixty tiles for a fire-place, how many dozen tiles does it take?

If your vacation is sixty days long, and you spend a fifth of the time at home, how many weeks are you at home?

What twelve equal numbers make sixty? What then is one-twelfth of sixty?

What piece of money is one-twelfth of sixty cents?

If in a term of twelve weeks a boy is absent one-sixth of the number of school-days, how many school-weeks is he absent?

When tea is sixty cents a pound, what will one-sixth of a pound cost? one-tenth of a pound? one-half of a pound?

My expenses for one month were sixty dollars. I spent one-half of the money for board, one-fifth for clothing, one-sixth for books and stationery, one-tenth for hired labor, and the rest in travelling. What did I spend for each item?

If a man buys old rubber at a half a cent a pound, what will he pay for sixty pounds? for fifty pounds? How much rubber will thirty cents buy? twenty-five cents?

How much will a man gain on four pounds of rubber if he buys it at a half a cent a pound, and makes it into toys which he sells at twenty cents a pound, if there is a waste of one pound?

If a loaf of bread costs the baker seven cents, and he sells it for ten cents, how much does he gain on a dozen loaves of bread?

A Second of Time.

What have I here? (A weight attached to a string.) The string is thirty-nine inches long. I will hang it on this hook, and make the weight swing. Whenever it passes just under the hook you may count.

How many have you counted? (10.)

Between each of your counts was a second of time. How many seconds was the weight swinging?

As I swing the weight again you may say aloud, but softly, *one second, two seconds, three seconds*, and so on. How many seconds did the weight swing this time? (15.)

You may now count silently, and when twenty seconds have passed, Eddie may stop the weight. Was he right, class?

When thirty seconds have passed, Annie may stop the weight.

When forty-five seconds have passed, Walter may stop the weight.

Count sixty seconds now, and then I will stop the weight.

You may see how many seconds it takes me to walk to the back of the room ; how many seconds it takes Minnie to make her slate clean ; how many seconds it takes Walter to write his name.

Annie may turn so that she cannot see the weight ; count ten seconds and turn back again. The others may count ten seconds by the swinging of the weight. Did Annie count right ? (She counted too fast.)

Emily may turn and count fifteen seconds. Was she right ? (She counted too fast.)

Walter may turn and count thirty seconds. Was Walter right ? (He was one second ahead.)

Half of the class may turn and count sixty seconds. The other half count by the swinging of the weight, and see who of those who turn are right.

All shut your eyes, and when you think sixty seconds have passed, you may raise hands. I will tell you who is nearest right.

Seconds in a Minute.

Look at the smallest hand of my watch. You may tell me when it has gone entirely round the little circle, and I will tell you how many swings the weight has made.

I will now watch the little hand, and you may count the swings. Do you find it to be sixty times, too ?

How many seconds then does it take the little hand to go entirely round the circle ?

Who knows what name we give to sixty seconds of time ? Carrie says it is a *minute* of time, and that is right.

Write on the board : Sixty seconds make a minute.

Who thinks he can tell when a minute of time is gone,

without looking at the watch or counting by the weight? We will let John try. He may step outside the door and wait just a minute. The others may see by the watch or by the weight how long he is gone. How long was he gone? (A half of a minute.)

Step to the board and write your names as many times as you can in a minute. When you have been writing a minute I will say, Now.

See how many different words you can write in a minute.

See how many words that rhyme you can write in a minute?

See how long a column of numbers you can write and add in a minute.

See if you can draw a square, an equilateral triangle, and a rectangle in a minute.

Make all the marks of punctuation, and all the letters of the alphabet in a minute if you can.

Count silently as high as you can in a minute.

How many seconds in half a minute? in one-fifth of a minute? in one-sixth of a minute? in one-tenth of a minute? in one-twelfth of a minute?

Ten seconds are what part of a minute?

Six seconds are what part of a minute?

Twelve seconds are what part of a minute?

Five seconds are what part of a minute?

Fifteen seconds are what part of a minute?

Twenty seconds are what part of a minute?

Minutes in an Hour.

Who knows how long it takes the long hand to go round the face of the clock? You are all right. It does take an hour.

Who knows how many minutes it takes the long hand to go from twelve to one? It does take five minutes. How

many minutes does it take the long hand to go from one to two? from two to three? from three to four? How many minutes does it take the long hand to go from any figure to the next figure? Let us see now if we can count up the number of minutes it takes the long hand to go round the face of the clock. If it takes five minutes to move from figure to figure, how many fives must we count? Twelve fives make how many? Then how many minutes does it take the long hand to go round the face of the clock? How many minutes then in an hour?

Write on the board : Sixty minutes make an hour.

How many minutes in half an hour? in one-quarter of an hour? in one-sixth of an hour? in one-twelfth of an hour? in one-third of an hour?

How many minutes in two hours? in three hours? in four hours?

How many minutes are you in school if the session is five hours?

If I stay an hour longer, how many minutes am I in school?

When the long hand is at one, how many minutes past the hour is it? When the long hand is at two, how many minutes past the hour is it? When it is at three? at four? at five? at six?

How many minutes of the hour is it when the long hand is at seven? at eight? at nine? at ten? at eleven?

At what figure does the long hand point at quarter past the hour? at half past the hour? at quarter of the hour? at twenty minutes past the hour? at twenty minutes of the hour?

Complete this table :

60 seconds =	7 days =
60 minutes =	4 weeks and 2 days =
24 hours =	12 months =

CHAPTER XXXII.

NUMBERS FROM SIXTY TO SEVENTY.

§ 68. THE NUMBER SIXTY-THREE.

Facts to be taught:

9×7	$\frac{1}{9}$ of 63	$63 \div 9$
$63 \div 7$	7×9	$\frac{1}{7}$ of 63

§ 69. THE NUMBER SIXTY-FOUR.

Facts to be taught:

8×8	$\frac{1}{8}$ of 64
$64 \div 8$	$\frac{1}{2}$ of 64

Exercise for Review.

In nine weeks how many days?

In nine weeks how many working-days?

In nine weeks how many school-days?

A man pays three dollars a week for his room, and four dollars a week for board. What does he pay in nine weeks?

If I pay a dollar a day for board, what do I pay for nine weeks' board?

A farmer sold a dozen eggs for twenty-three cents, and five quarts of berries at eight cents a quart, and took in payment sugar at seven cents a pound. How many pounds did he receive?

If it took a man sixty-three days to do a piece of work, how long did it take him to do one-ninth of the work?

If I pay sixty-three dollars for nine weeks' board, what is that a day?

When bananas are five cents each, and oranges four cents, what must I pay for seven of each?

One room is four yards long, and another room five yards long. How many yards of carpeting will it take for both rooms if each takes seven strips?

Twenty-one yards of wall-paper will cut how many strips of paper each nine feet long?

A man who is three score and three years old is seven times as old as his grandson. How old is his grandson?

If a man earns sixty-three dollars a month, and spends fifty-six dollars, how many months will it take him to save a month's wages? What part of a year?

A stationer who buys blank-books for forty-one cents sells them at fifty cents each. If in one day he gains sixty-three cents from the sale of these books, how many books does he sell that day?

A boy who earns eight cents an hour works eight hours a day. How much does he earn in a day? If he spends fourteen cents a day, how much money will he have at the end of the week?

What must I pay for a peck of cherries at eight cents a quart? If they shrink one-half in cooking, how many pint jars of sauce shall I have? If cherries cost eleven cents a pint when canned, how much money do I save in putting up a peck of cherries for myself?

If a glazier has sixty-four panes of glass, how many windows each containing eight panes can he fill?

If it takes a steamer eight days to make a trip, how many trips will it make in two months of thirty-one days each, and two more days?

If sixty-four pounds of flour will last a family eight weeks, how much does the family use in one week?

A bicycle goes sixty-four miles in eight hours. What is the rate per hour?

There are thirty-two quarts in a bushel. How many quarts in two bushels?

A two-pound weight equals thirty-two ounces. How many ounces will a four-pound weight equal?

If a bushel of beans weighs sixty-four pounds, what will a half-bushel weigh? What will a peck weigh? What will a quart weigh?

If a pound of cake costs the baker thirty-five cents, and he sells it for forty cents, what does he gain on a dozen pounds of cake?

If a sick man must take two powders every three hours, how many powders will he take in a day, if he sleeps six hours? How many will he take in five days?

If a French coin called a franc is worth twenty cents of our money, how many francs are worth a dollar? Three dollars are equal to how many francs? Ten dollars are equal to how many francs?

If two kinds of beans worth eight cents and ten cents a quart are mixed, what will be the price of a quart of the mixture?

How many bottles will be required for nine gallons of wine, if it takes five bottles for a gallon?

Forty bottles will hold how many gallons of wine at five bottles for a gallon?

If a dealer in gloves buys at a dollar a pair, and sells at a dollar and a quarter, how much does he gain on a dozen pairs of gloves if one pair of gloves proves worthless?

If children's stockings can be bought at twelve and a half cents apiece, what will four pairs cost? What part of a dollar?

How many legs must be made for twenty-one wooden horses?

There are fifty-two weeks in a year. How many weeks are in four years?

There are thirty-two quarts in a bushel. How many quarts in three bushels?

If a bushel of potatoes weighs sixty pounds, what will nine bushels weigh?

A man who had ninety-seven turkeys sold seventy-four. How many had he left?

A barrel of flour weighs one hundred and ninety-six pounds. When sixty-four pounds have been used, how many pounds are left?

If there are eighty-seven pages in your reader, and you have read fifty-four pages, how many pages have you still to read?

What was the cost of a man's breakfast if he paid five cents for a cup of coffee, twelve cents for fish, and thirty-two cents for bread and meat?

A lady doing her marketing bought a head of lettuce for twenty-three cents, some tomatoes for fifteen cents, and some beef for fifty cents. How much did she spend?

A house three stories high had eight windows for each story in front, half that number in each story behind, and a fourth of that number on each side. How many windows had the house?

What is the height of a house if the ground floor is twelve feet high, the next floor eleven feet high, and the garrets and roof fifteen feet high?

Three times four-sixths are how many whole ones?

Four times five-tenths are how many whole ones?

Three times six-ninths are how many whole ones?

Four times six-eighths are how many whole ones?

Six times six-ninths are how many whole ones?

Twelve times four-sixths are how many whole ones?

Square Numbers.

Draw a square two inches on a side. Divide it into square inches. How many square inches does the square contain?

If the square were two feet on a side, how many square feet would it contain?

If the square were two yards on a side, how many square yards would it contain?

If any square is two units on a side, how many such square units will it contain?

Since any square two units on a side contains four square units, we say the square of two is four.

Write: The square of two is four.

We usually express it this short way: $2^2 = 4$.

Draw a square *three* inches on a side, and find the number of square inches it contains.

Draw a square three feet on a side, and find how many square feet it contains.

How many square yards in a square that is three yards on a side?

If a square is three units on a side, how many such square units will it contain?

What, then, is the square of three?

Express it in this way: $3^2 = 9$.

Who can think how many square inches a square four inches on a side will contain? Find out by drawing a square if you cannot think.

If any square is four units on a side, how many such square units will it contain?

Express the square of four. ($4^2 = 16$.)

If a square is five units on a side, how many square units will it contain?

Express the square of five: ($5^2 = 25$.)

If a square is six units on a side, how many square units will it contain?

Express the square of six. ($6^2 = 36$.)

Express the square of seven.

If a square is eight inches on a side, how many square inches will it contain?

Express the square of eight.

Name the numbers between one and twenty that are square numbers; between twenty and fifty. What other square numbers do you know?

Odd and Even Numbers.

Name a number that will contain two without a remainder. (4.)

Four is an *even* number.

Name another number that will contain two without a remainder. (8.)

Eight is an *even* number.

Name another even number.

Name as many even numbers as you can think of.

Begin with two and name them in order.

Who can write a dozen even numbers in a minute?

Write a score of numbers that are not even.

Such numbers are *odd*.

Name ten odd numbers, beginning with one.

See if you can discover with what figures even numbers must end.

If even numbers end with 0, 2, 4, 6, or 8, with what figures do odd numbers end?

As I express these numbers you may tell me whether they are odd or even: 15, 9, 18, 21, 25, 26, 30, 74, 87.

CHAPTER XXXIII.

NUMBERS FROM SEVENTY TO EIGHTY-FOUR.

§ 70. THE NUMBER SEVENTY-TWO.

Facts to be taught :

12×6	6×12	9×8	8×9
$72 \div 6$	$72 \div 12$	$72 \div 8$	$72 \div 9$
$\frac{1}{12}$ of 72	$\frac{1}{6}$ of 72	$\frac{1}{9}$ of 72	$\frac{1}{8}$ of 72

§ 71. THE NUMBER EIGHTY-ONE.

Facts to be taught :

9×9	$\frac{1}{9}$ of 81	$81 \div 9$	9^2
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Exercise for Review.

A man who buys chairs for twenty-four dollars per dozen sells them for thirty dollars per dozen. What does he gain on twelve dozen chairs?

If I pay a cent apiece for apples, two cents apiece for peaches, and three cents apiece for pears, what do I pay for a dozen of each?

A stationer bought twelve dozen pens for seventy-two cents, and sold them for twelve cents a dozen. What did he gain on the lot?

If a man saves from his earnings twelve dollars a month, how much will he save in half a year?

If I earn thirty-six dollars a week, and save one-sixth of it, in how many weeks shall I save seventy-two dollars?

Two ships are sailing in the same direction, seventy-two miles apart. If the second ship gains on the other twelve miles a day, in how many days will it overtake the first?

If the price of a mirror is seventy-two dollars, and one-sixth of the price is deducted from it, what then is the price of the mirror?

A man paid sixty-four dollars for chairs at eight dollars each, and sold them for nine dollars each. For how much did he sell them?

How many baskets will six dozen oranges fill, if each basket holds eight oranges?

A horse travelled seventy-two miles in twelve hours. A bicycle went the same distance in nine hours. What was the difference in speed per hour between the horse and the bicycle?

If a boy begins school at five years old and goes to school nine months a year until he is fourteen years old, how many months schooling will he have if he is out of school one year in the meantime?

Eight years give how many school months at nine school months a year?

Six dozen rosebuds will be enough for how many bouquets, if nine are used for each bouquet?

My room is six feet between the ceiling and the mop-board. If there is a bordering above and below, each one-eighth of this distance in width, how many inches between the two borders?

If it costs five cents for meat and four cents for bread for breakfast, what will nine breakfasts cost?

I have in my purse three quarters of a dollar, a five-cent piece, and one cent. How many slates at nine cents each will the money buy?

Our pear tree bore eighty-one pears this year. If we eat one-ninth of the pears each day, how many days will they last?

How many square inches will a square nine inches on a side contain? If the square were one inch less on a side, how many square inches would it contain? If it were two inches less on a side, how many square inches would it contain?

In a silk quilt that I am making, some of the squares are three inches on a side and some five inches. How many more square inches in one square than in the other?

How many more squares two inches on a side can you cut from a square six inches on a side than from a square four inches on a side?

How many more squares three inches on a side can you cut from a square nine inches on a side than from one six inches on a side?

The square of nine divided by the square of three is how many? The square of eight divided by the square of four? The square of six divided by the square of two?

The square of nine equals how many nines? The square of seven equals how many sevens? The square of five equals how many fives?

If my watch is thirty seconds slow, what part of a minute is it behind time?

If it is a thirty minutes' walk to school, what part of an hour does it take to walk to school?

What part of an hour are ten minutes? twenty minutes?

Where is the long hand when the time is fifteen minutes past three? ten minutes past three? twenty minutes past three? half past three? a quarter of four? quarter past four?

Where are the hands of a clock at four o'clock? at eight o'clock? at ten o'clock?

What time is it when both hands point to twelve?

What kind of an angle is formed by the two hands of a clock at three o'clock? At what other hour is the same angle formed? What kind of an angle is formed at five o'clock? at eleven o'clock? at one o'clock? What kind of a line is formed by the hands of a clock at six o'clock?

Write in a line the numbers that contain nine without a remainder as far as eighty-one, and see if you can discover anything remarkable about the numbers.

Write in a line the numbers that contain eleven without a remainder as far as seventy-seven, and discover what you can about them.

Write in a line the numbers that contain five without a remainder as far as eighty, and tell me what you can about them.

With what figure does every number end that contains ten without a remainder?

Can you think of any odd number that contains an even number without a remainder?

Can you think of any odd numbers that contain odd numbers without a remainder?

Into how many parts must you divide five to get one for each part? Into how many parts must you divide fourteen to get two for each part? Into how many parts must you divide thirty to get six for each part? forty to get five for each part? fifty-four to get nine for each part? sixty-three to get seven for each part? seventy-two to get six for each part? to get twelve for each part? to get eight for each part? to get nine for each part?

Two pounds are how many ounces?

Two quires of paper are how many sheets of paper?

Five reams of paper are how many quires of paper?

A man buys a stove for old iron, paying \$1.00 for it. He fits it up with a new grate, a new door, and some new

hinges, which cost him \$1.00 all together, and sells the stove for \$7.00. What does he make by his bargain?

How much money will it take for your dictionary at \$2.25, your reader at \$1.25, your geography at \$1.38, your drawing-book at \$0.25, your history at \$0.75, and your pencils and paper at \$0.45? (\$6.33.)

If I buy a barrel of flour for \$7.37, a barrel of sugar for \$12.75, a gallon of molasses for \$0.85, a tub of butter for \$6.68, some meat for \$0.68, and vegetables for \$0.47, what do I pay for the whole? (\$28.80.)

If I read 14 pages in a book one day, 27 another day, 35 another day, 19 another day, 47 another day, 17 another day, and there are 87 more pages in the book, how many pages does the book contain? (246 pages.)

I bought some dress goods for \$17.75, some lace for \$8.37, some buttons for \$0.75, some dress lining for \$0.47, a stick of braid for \$0.06, and some some sewing silk for \$0.28. What was my bill for the whole? (\$27.68.)

Of \$1.87 which I had in my purse I spent \$0.07 for a box of elastic bands, \$0.25 for two quires of paper, \$0.09 for four pencils, and \$0.27 for a book. What had I left? (\$1.19.)

If I earn \$107.00 one month and \$125.00 another month, how much more do I earn the second month than the first? (\$18.00.)

If there are 181 children on the upper floor of a room, and 157 on the lower floor, how many more children on the upper floor than on the lower floor? (24 children.)

A bushel of corn weighs 56 pounds. What will 6 bushels weigh? (336 pounds.)

A barrel of flour weighs 196 pounds. What will a load of 8 barrels weigh? (1568 pounds.)

A gross of pens is 144 pens. How many pens in 9 gross? (1196 pens.)

How many sheets of paper in 9 quires of paper? (216 sheets of paper.)

How many ounces in 8 pounds? (128 ounces.)

How many quarts in 8 bushels? (256 quarts.)

In an orchard there were 6 rows of trees with 13 trees in each row, and 37 trees around the outer edge of the orchard. If 58 of these trees died, how many were left? (57 trees.)

A man bought 2 bushels of apples at \$0.75 a bushel, and sold them for \$0.37 a peck. How much did he gain if one peck of apples decayed? (\$1.09.)

If a pound of flour is put into each loaf of bread, how many loaves of bread can be made from 2 barrels of flour? (392 loaves.)

The Rod.

Bertha may take one end of this string and Charles the other end. Stand as far apart as the length of the string. Bertha and Charles are a *rod* apart. How long then is the string they hold?

I have here several other strings just as long. How long is each?

Edna and Mary may take one, and mark off a rod on the platform.

Annie and Harry may take another, and measure off a rod on the long blackboard.

Sarah and Maggie may measure off a rod on the floor.

The others may see if the measuring is correctly done.

How long a distance have you marked off in each case?

John may see how many of his steps it takes to make a rod.

Clarence, place yourself a rod from the door. You are two inches short of a rod.

Clara, place yourself a rod from my table. You are right within half an inch.

What distance in the school yard do you think to be a rod? Who has ever seen any one measure with a rod line?

What is measured by the rod?

I will give each two of you a line which is a rod long, and some time to-day you may measure off a rod in the school yard. Place small sticks to mark the distance.

Yards in a Rod.

Who has found out how many yards there are in the line which measures a rod?

You may measure your rod lines, using the yard lines which I have drawn on the board. How many times do you find the yard to be contained in the rod? Each distance then which you have measured and found to be a rod contains how many yards?

Write: Five and a half yards equal a rod.

Two rods equal how many yards? three rods? seven rods? ten rods? twelve rods?

A rod equals how many feet?

Rods in a Mile.

If I ask how far it is to the next town, will the distance be given me in inches? Will it be given me in feet? in yards? in rods? In what will the distance be given me?

John is right when he says the distance will be given me in miles.

Name a point that is a mile from here; that is two miles; that is several miles.

Name any two points you know that are a mile apart.

What is the longest distance in miles that you have walked at one time?

How many miles do you think all the steps that you take in a day would make? If you should carry in your pocket a little instrument called a pedometer, it would mark the number of steps you take, and, if you know the length of your step, can you find how far you have walked during the day? If, for example, you walk ninety-eight steps, and

your step is two feet, how many feet do you walk? If you take one hundred and fifty steps, how many feet do you walk? If you take eight steps in walking a rod, how many rods do you walk in taking seventy-two steps?

If you should walk *three hundred and twenty* rods, you would walk a *mile*. If you walk two miles, how many rods do you walk? three miles? six miles? seven miles?

If you take eight steps in walking a rod, how many steps will you take in walking a mile?

If you can walk a rod in three seconds of time, how many seconds will it take you to walk a mile?

Write : Three hundred and twenty rods equal a mile.

What is the name of the shortest distance you know? of the next longer distance? of the next longer distance? of the next longer distance? of the longest distance?

Write in a table the number it takes of each of these distances to equal one of the next higher.

You have written the *Table of Long Measure*.

Read the table of long measure.

Roman Numerals.

You may express one on the board in all the ways you can. (1, one, I.)

If you look at the clock, you will see another way.

What other letters are used to express numbers on the clock?

There are four other letters used to express numbers: L, C, D, M. How many letters are used to express numbers? Name them. Write them in their order.

A people, called the Romans, first used these letters to express numbers, so we call them the *Roman Numerals*.

Express one with a Roman numeral.

Look at the clock, and then express five with a Roman numeral. Express ten with a Roman numeral.

I will express fifty with a Roman numeral ($L = 50$).

What letter expresses fifty?

What letter expresses one?

What letter expresses five?

What letter expresses ten?

What letter expresses fifty?

What number does I express?

What number does V express?

What number does X express?

What number does L express?

C stands for one hundred.

Express one hundred with a Roman numeral.

Look at the figures I have written on the board. (1, 5, 10, 50, 100.) As I touch each, tell me the letter to write for it?

What letter comes next? (D.)

D stands for five hundred.

Express five hundred with a Roman numeral. ($D = 500$.)

The remaining letter expresses one thousand.

Write: M stands for one thousand. ($M = 1000$.)

Name the letters that are used to express numbers. What are they called?

Copy and learn: $I = 1$; $V = 5$; $X = 10$; $L = 50$; $C = 100$; $D = 500$; $M = 1000$.

Combination of Roman Numerals to form Other Numbers.

What value does I denote?

What value does V denote?

Of these two letters, I and V, place the one denoting the *less* value *before* the other.

Read what you have written (IV).

Subtract the value of the less from the greater, and you will have the number for which IV stands.

This is one way the Romans used to make up their numbers.

What value does X denote?

Of these two letters, I and X, place the one denoting the *less* value *before* the other.

Read what you have written (IX).

Subtract the less from the greater, and you will find what IX stands for.

What value does L denote?

Of these two letters, X and L, place the one denoting the less value before the other.

Read what you have written (XL).

Subtract the value of the less from the greater, and you will find what XL stands for.

What does XC stand for?

As I point to these Roman numerals, you may name the value which they express: I, IV, V, X, L, C, D, M, IV, IX, XL, XC, IX, L, XL, C, XC.

What four new numbers have you made to-day with the Roman numerals? (4, 9, 40, 90.)

What stands for four? What stands for forty?

What stands for nine? What stands for ninety?

When I stands before V, what do you do to find the value of IV?

When I stands before X, what do you do?

When X stands before L, what do you do?

When X stands before C, what do you do?

What Roman numeral stands for one?

Who knows what stands for two? for three?

If two I's stand for two, what should you think two X's would stand for? three X's?

Since two X's stand for twenty, what should you think two C's would stand for? three C's? four C's? two M's? three M's?

Name the number as I show you the Roman numerals:

II, III, IV, V, IX, X, XX, XXX, XL, L, XC, C, CC, CCC, CCCC, D, M, IV, IX, XL, XC, XX, XXX, CC, CCC.

You may write these numbers in Roman numerals: 1, 2, 3, 4, 5, 9, 10, 20, 30, 40, 50, 90, 100, 200, 300, 400.

When two letters of the same value stand together, what do you do to find the value expressed?

How many ways have you found that the Romans put letters together to make numbers?

If you look at the clock, you will find how six is made. What forms six? But where does the less number stand with reference to the greater? And what do you do to the two numbers to find six? What other numbers on the clock are made in the same way?

Who knows any other numbers made in the same way?

All numbers that you have not already learned to express in Roman numerals are made in this way.

See if you can express the numbers between twelve and twenty; between twenty and thirty; between thirty and forty; between forty and fifty.

Add and express the sum in Roman numerals:

Five, seven, six, nine, eight, six.

Twelve, eight, nineteen, three, seven, one.

Three, eight, seven, five, eight, six.

Four, nine, thirteen, three.

Two, seven, six, four.

Seven, eight, ten, twenty-five, eleven, eight.

Eight, nine, seventeen, eight, twenty, nine.

Write in Roman numerals the odd numbers to twelve.

Express all the numbers you can, using but one letter for each number.

Express all the numbers you can, using but two letters for each number.

Express the products of ten as far as one hundred in Roman numerals.

CHAPTER XXXIV.

NUMBERS FROM EIGHTY-FOUR TO ONE HUNDRED.

§ 72. THE NUMBER EIGHTY-FOUR.

Facts to be taught :

12×7	7×12	$\frac{1}{2}$ of 84
$84 \div 7$	$84 \div 12$	$\frac{1}{4}$ of 84
$\frac{1}{12}$ of 84	$\frac{1}{7}$ of 84	2×42

§ 73. THE NUMBER NINETY-SIX.

Facts to be taught :

12×8	8×12	$\frac{1}{3}$ of 96
$96 \div 8$	$96 \div 12$	3×32
$\frac{1}{12}$ of 96	$\frac{1}{8}$ of 96	2×48

Exercise for Review.

Nellie is 9 years old, and Annie is 16. What is the difference of their ages in months?

In a dozen weeks how many days?

If I pay for room rent \$7.00 a month, what is my rent for a year?

A man made a fence across a garden that is 12 yards wide. If he put in posts 2 yards apart to support the railing, how many posts did he use, providing there was a post at each end? How many posts would be required for 12 fences the same length? If the fence formed one straight line, but 12 times as long as the fence across the garden, would 84 posts be required? Why?

A grocer paid \$0.84 for figs at \$0.07 a pound. He lost two pounds by drying and by bad figs. If he sold the rest at \$0.10 a pound, what did he gain on the whole?

How many times does the short hand go round the dial in 84 hours?

While the short hand is going round the dial 7 times, how many times does the long hand go round the dial?

How many times does the short hand go round the dial in a day? How many times will it go round in 42 days?

How broad is a lake which is 42 feet half-way over?

If \$0.12 is a seventh of the price of a book, what is the price of the book?

A strip of ribbon 84 yards in length was cut into 7 equal pieces. How many yards were in each piece? If the ribbon was sold at \$0.84 a piece, what was the price per yard?

If a merchant sells 21 yards of silk for a dress, how many yards are in a piece of goods from which he can sell 4 dresses?

What four equal numbers make 84? What, then, is one-fourth of 84?

If there are 84 windows in a building, and one-fourth of this number is in the front of the building, how many windows are on the two sides and at the back?

If \$0.84 will buy 12 car-tickets, what is the price of one car-ticket?

A man charged \$0.84 a yard for carpeting, but at length agreed to deduct one-twelfth of that price. What, then, was his price for the carpeting? How much less did 12 yards cost than if the first price had been paid? How many yards of carpet lining would that buy at \$0.07 a yard?

If a peck of berries cost \$0.96, what is that a quart?

Into how many piles can I separate 96 oranges, if I put a dozen in each pile?

A man has 4 baskets, each containing 24 apples. If he sells them at \$0.05 a dozen, what will he receive?

A man had 96 books. He sold 84 books. What part of the whole number had he left?

A man shipped eight dozen boxes of oranges from Florida. When the oranges arrived, $\frac{1}{2}$ was found to have decayed. How many boxes were good?

A train travels ninety-six miles in three hours. What is the rate of speed per hour?

A man bought a bushel of peaches at \$0.03 a quart. What did he pay for the bushel of peaches?

If a large cask holds 48 gallons, what will 2 casks hold?

A man works 96 hours in a week and two days. How many hours a day does he work?

If a pencil costs \$0.05 and an eraser costs \$0.03, what will a dozen of each cost together? How many cents less than a dollar?

At \$0.08 a card, how many cards can I buy for \$0.96?

Charles gets \$6.00 a month for helping his father. Emma gets $\frac{1}{2}$ as much for helping her mother. How much will both have earned in a year?

How broad is a house which is 3 rooms in breadth, each room being 15 feet broad, the two outer walls being each 2 feet thick, and the partitions between the rooms each $\frac{1}{2}$ a foot thick?

How many rods are there in 3 miles?

How many hours are there in a week?

If an orange is worth 3 apples, how many apples are a dozen oranges worth? How many oranges are a dozen apples worth?

How far is it around a square which is 19 feet on a side?

If one scale pan had 25 pounds in it, and the other had 13 pounds in it, how many pounds must be taken from one and put into the other to make the scales balance?

Into how many bunches, containing 5 bananas each, can you separate a bunch of 40 bananas? a bunch of 60 bananas? a bunch of 30 bananas?

If you use a drop of ink at 2 dips, how many dips can you take from a bottle containing 125 drops, if 15 drops dry up?

If I packed 84 pairs of shoes in 4 boxes, putting an equal number of pairs in each box, how many pairs did I put in each box?

A man had a dozen boxes of candy, and 8 pounds in each box. If he put this candy up in packages containing a quarter of a pound each, how many packages will he have?

If while you were pumping 20 gallons of water out of a well, one gallon ran in, how many gallons less were there in the well after you pumped the water than before?

If each one of a family of 8 persons use 2 gallons of water in a day, how much will they use in a week?

A quire of paper will make how many strips of paper, if each sheet is cut into four strips?

If I start from my home and travel 4 miles in one direction, and then turn about and travel 5 miles from my home in the opposite direction, how many miles do I travel before I reach home?

If I go to West Rock, which is 3 miles from my home, and then to East Rock, which is 5 miles from my home in the opposite direction, how far do I travel before I reach home?

A river at low water was 200 feet wide, but at high water it spread over the shore on one side 25 feet, and on the other side 38 feet. How wide was the river at high water?

What will 4 dozen plates, at \$1.87 a dozen, and 6 dozen saucers, at \$0.98 a dozen, cost?

Which is the cheaper, boots at \$3.00 a pair, if I wear out 4 pairs in a year, or boots at \$8.00 a pair, if I wear out 3 pairs in two years?

If you have a half a dollar, how many quarters of a dollar is it worth? how many eighths of a dollar?

If you have a half of a quire of paper, how many sixths of a quire have you? how many twelfths of a quire?

If Jennie is $\frac{1}{2}$ a score of years old, and her brother is $\frac{1}{10}$ of a score of years old, how many times as old as her brother is Jennie?

If it takes $\frac{1}{6}$ of a yard of ribbon for a loop, how many loops will $\frac{1}{3}$ of a yard of ribbon make?

It is required to cut a loaf of cake into ninths. It is already cut into thirds. Into how many pieces must I cut each third to cut the whole into ninths?

If you sleep $\frac{1}{3}$ of the day, how many twelfths of the day do you sleep?

$\frac{1}{2}$ equals how many fourths? equals how many sixths? equals how many eighths? equals how many tenths? equals how many twelfths?

$\frac{1}{3}$ equals how many sixths? equals how many ninths? equals how many twelfths?

$\frac{1}{4}$ equals how many eighths? equals how many twelfths?

$\frac{1}{5}$ equals how many tenths?

$\frac{1}{6}$ equals how many twelfths?

$\frac{2}{2}$ equal how many ones?

$\frac{3}{3}$ equal how many ones?

$\frac{4}{4}$ equal how many ones?

How many fifths in a whole?

How many sixths in a whole?

How many sevenths in a whole?

In 3 oranges how many halves?

In 4 dollars how many fourths?

In 2 yards of ribbon how many sixths?

In 5 pounds how many thirds of a pound?

In 2 dollars how many fifths of a dollar?

In 3 yards how many sevenths of a yard?

In 4 bushels how many eighths of a bushel?

If you have $\frac{2}{5}$ of a dollar and I have $\frac{1}{5}$, how many fifths have we together?

If a grocer has $\frac{3}{8}$ of a bushel of beans of one kind, and $\frac{4}{8}$ of a bushel of another kind, how many eighths has he of both kinds?

If a salesman sells $\frac{1}{6}$ of a yard of ribbon to one person, $\frac{2}{6}$ to another, and $\frac{5}{6}$ to another, how many sixths does he sell all together?

If there is $\frac{1}{2}$ of a yard of ribbon in one piece and $\frac{1}{4}$ of a yard in another piece, how many fourths of a yard are in the two pieces together?

If I buy $\frac{1}{2}$ a pound of one kind of dates and $\frac{1}{8}$ of a pound of another kind, how many eighths of a pound do I buy in all?

If I have $\frac{1}{2}$ of a yard of velvet and $\frac{1}{6}$ of a yard, how many sixths of a yard do I have?

If it is $\frac{1}{2}$ of a mile to the post-office and $\frac{1}{10}$ of a mile farther to the depot, how many tenths of a mile is it to the depot?

I have $\frac{1}{2}$ of a quire of letter paper and $\frac{1}{12}$ of a quire of note paper. How many twelfths of a quire of paper have I all together?

If John gathers $\frac{1}{4}$ of a bushel of walnuts and $\frac{1}{8}$ of a bushel of chestnuts, how many eighths of a bushel does he gather of both kinds?

If a small corner of our yard is $\frac{1}{4}$ of a rod on one side and $\frac{1}{12}$ of a rod on the other side, how many twelfths of a rod is it on both sides?

If it is $\frac{1}{8}$ of a mile to Walnut Hill and $\frac{1}{6}$ of a mile up the hill, how many sixths of a mile is it from here to the top of the hill?

If the dado of a room is $\frac{1}{3}$ of the height of the room, and the border at the top of the room is $\frac{1}{3}$ of its height, how many ninths of the height of the room are both dado and border?

If I find $\frac{1}{3}$ of a dozen of eggs in one nest and $\frac{1}{12}$ of a dozen in another nest, how many twelfths of a dozen of eggs do I find in both nests?

If you have $\frac{1}{5}$ of a dollar and I have $\frac{1}{10}$ of a dollar, how many tenths have we together?

If you are in school $\frac{1}{6}$ of the day and study at home $\frac{1}{12}$ of the day, how many twelfths of the day do you give to school work?

Fred had 50 dollars, and spent $\frac{1}{2}$ of it for a watch, and $\frac{1}{10}$ of it for a pair of shoes. How many tenths of it did he spend?

A grocer sold $\frac{1}{4}$ of a bushel of pears to one customer, $\frac{1}{8}$ to another, and $\frac{3}{16}$ to another. How many sixteenths of a bushel did he sell?

John spent $\frac{4}{5}$ of a dollar for a book, $\frac{7}{10}$ of a dollar for half a ream of paper, and had $\frac{1}{2}$ of a dollar left. How much money had he at first?

James paid $2\frac{1}{2}$ dollars for a hat, $3\frac{1}{2}$ dollars for a vest, and $10\frac{1}{2}$ dollars for a coat. What did the whole cost?

Edgar can do a certain piece of work in 3 days, and George can do the same work in 6 days. What part of the work can Edgar do in 1 day? What part of the work can George do in 1 day. What part of the work can both together do in 1 day?

A grocer sold $\frac{1}{2}$ of a dozen of oranges to one man, $\frac{1}{3}$ of a dozen to another, and $\frac{5}{6}$ of a dozen to another, and had 2 dozen left. How many oranges had he at first?

How many yards is it half-way round a flower-bed which measures 18 feet on each side, and 12 feet on each end?

CHAPTER XXXV.

PROCESSES IN WRITTEN ARITHMETIC CONTINUED.

§ 74. THIRD STEP IN MULTIPLICATION.

When the multiplier consists of two figures and the left hand figure is 1.

I have 14 boxes with three dozen eggs in each box. I want you to find how many eggs I have. Express the example on the board. You may first find how many eggs I have in 4 boxes. How many more boxes have I? Find then how many eggs I have in 10 boxes.

How many eggs in 4 boxes? (144.)

How many eggs in 10 boxes? (360.)

How many eggs in 14 boxes?

Then 14 times 36 are how many?

Frank earned \$0.75 a day. How much did he earn in 13 days? Find first how much he earned in 3 days; then how much he earned in 10 days; and at last how much he earned in the whole time.

In 16 bushels how many quarts? First find how many quarts in 6 bushels; next, how many quarts in 10 bushels, and then how many quarts in 16 bushels.

If a bushel of corn meal weighs 56 pounds, how many pounds will a bin which holds 15 bushels contain? What shall we do first? (Find how many pounds in a bin which holds 5 bushels.) What next? (Find how many pounds in a bin which holds 10 bushels.) What next? (Add, to find how many pounds in 15 bushels.)

An engineer rides 97 miles in a day. How many miles does he ride in three weeks if his train does not run Sundays? What shall we do first? (Find how far he rides in 8 days.) What next? (Find how far he rides in 10 days.) What last? (Add, to find how far he rides in 18 days.)

A merchant sold in one month 17 silk cloaks at \$17 each. What did he receive for all of them together?

If I have a square that is 18 feet on a side, how many square feet are there in the square?

NOTE.—In a short time the child discovers that he can multiply by units of tens as easily as by single units, always remembering that the first product is tens. When he arrives at this knowledge he can multiply by any number of tens, and is ready to pass to the next step in multiplication.

Further steps in Multiplication.

36	364	225	367
47	47	247	105
—	—	—	—
360	64	64	64
105	10	100	1000
—	—	—	—
64	64	64	6400
30	300	3000	3000
—	—	—	—

Multiplications that can be Performed by Short Methods.

1. Multiplication by 9.

Annex a cipher, and subtract the number to be multiplied.

2. Multiplication by 11.

Place the sum of the digits between the digits.

3. Multiplication by 25.

Annex two ciphers, and divide by four.

4. Finding the square of a number whose units' figure is 5.

Multiply the tens by the next higher number of tens, and add the square of 5.

5. Multiplication of two numbers whose units are five and the difference of whose tens is 1.

Square the highest number of tens, and from the result subtract the square of 5.

6. Multiplication of two numbers the sum of whose units is ten, and the difference of whose tens is one.

Square the highest number of tens, and from the product subtract the square of the units of the highest number.

§ 75. FIRST STEP IN DIVISION.

When the dividend is a multiple of ten, and the number of tens is a multiple of the divisor, and the divisor is a number of units.

Which is more, two tens or ten twos?

Which is more, six tens or ten sixes?

Which is more, four tens or ten fours?

Which is more, seven tens or ten sevens?

Which is more, nine tens or ten nines?

Two tens equal how many *twos*?

Three tens equal how many threes?

Four tens equal how many fours?

Six tens equal how many sixes?

Eight tens equal how many eights?

Nine tens equal how many nines?

Each take this number of splints. (60.) How many *two-tens* have you? Since two tens and ten twos are the same, *three* two-tens are how many ten-twos? (Three ten-twos.)

How many three-tens do you find in 60? Then how many ten-threes? (Two ten-threes.)

How many six-tens do you find?

How many ten-sixes then?

Take 120 splints. How many two-tens in 120? How many ten-twos?

How many three-tens in 120? How many ten-threes?

How many six-tens in 120? How many ten-sixes?

Take 90 splints. How many three-tens in 90? How many ten-threes?

Take 140 splints. How many two-tens in 140? How many ten-twos? How many seven-tens in 140? How many ten-sevens?

How many ten-twos in 80? * How many ten-fours in 80?

How many ten-twos in 100? How many ten-fives in 100?

How many ten-twos in 160? How many ten-fours in 160? How many ten-eights in 160?

How many ten-twos in 40? *Two* (times) *ten*-twos are how many *twos*? Then how many *twos* in 40?

How many ten-twos in 60?

Three (times) *ten*-twos are how many *twos*? Then how many *twos* in 60?

See if you can find how many *twos* in 80. Find the *ten*-twos first, and then you can tell how many *twos*.

Find how many *twos* in 100. How many *twos* in 120? How many *twos* in 140?

Find how many *threes* in 60. First find how many *ten*-threes, and you can tell how many *threes*.

Find the number of *threes* in 90; in 120; in 150.

Find the number of *fours* in 80; in 120; in 160.

Find the number of *fives* in 100; in 150.

Find the number of *sixes* in 120; in 180.

* Use splints.

Find the number of sevens in 140.

Find the number of eights in 160.

Find the number of nines in 180.

Express on the board, forty divided by two; eighty divided by two; one hundred divided by two; one hundred and twenty divided by two; one hundred and forty divided by two.

Express, sixty divided by three; ninety divided by three; one hundred and twenty divided by three; one hundred and fifty divided by three; eighty divided by four; one hundred and twenty divided by four; one hundred and fifty divided by five; one hundred and eighty divided by six; one hundred and forty divided by seven; one hundred and sixty divided by eight; one hundred and eighty divided by nine.

§ 76. SECOND STEP IN DIVISION.

When each order in the dividend is exactly divisible by the divisor.

You may express the division of forty-four by two.

How many twos in forty?

How many twos in four?

Then how many twos in forty-four?

Express the division of sixty-nine by three.

How many threes in sixty?

How many threes in nine?

Then how many threes in sixty-nine?

Express the division of eighty-eight by four.

How many fours in eighty?

How many fours in eight?

Then how many fours in eighty-eight?

Divide sixty-four by two.

Divide forty-four by two.

Divide sixty-six by three.

Divide ninety-three by three.

Divide ninety-six by three.

Divide ninety-nine by three.

Divide one hundred and twenty-six by three.

Divide one hundred and twenty-nine by three; fifty-five by five; one hundred and five by five; one hundred and twenty-six by six.

Further steps in division :

$$6 \overline{)96}$$

$$3 \overline{)37}$$

$$4 \overline{)136}$$

$$8 \overline{)240}$$

$$2 \overline{)402}$$

$$7 \overline{)721}$$

$$13 \overline{)57(}$$

$$13 \overline{)152(}$$

$$13 \overline{)141(}$$

Exercise for Review.

A boy picked from one vine enough grapes to fill a bushel measure, a half-bushel measure, and a peck measure. How many pecks of grapes did he pick? If he sells the grapes at \$0.07 a quart, what does he get for a peck? If he had sold the grapes for \$0.06 less per peck, what would he have received for the whole lot? By selling his grapes at \$0.50 a peck, how much less money would he get for the whole than by selling them at \$0.07 a quart?

How much oil do we use in 8 weeks if we use a quart each evening?

If you put a bushel of corn, which weighs 56 pounds, into 8 baskets, each holding the same amount, how many pounds of corn will each basket contain?

A man puts 56 quarts of milk into cans holding 8 quarts each, but does not fill the cans within a quart each. How many more cans will he use than if he filled each can?

A man who carried 56 eggs to market found $\frac{1}{8}$ of the number broken when he unpacked them. If eggs were selling for \$0.03 each, how much did he lose?

If you earn \$56.00 in 7 weeks, what is that per week?

If Robert found 9 hens' nests with a half dozen eggs in each nest, and left one egg in each nest for the nest-egg, how many eggs did he take away?

How many square inches in a square 7 inches on a side?

How many inches wide is the window of a conservatory for flowers if there are 9 panes of glass across it, each a half foot in length, and the bars take up six inches?

In 9 pecks of beans how many quarts of beans, if they shrink in drying one quart to a peck?

A man gave his note payable in 60 days. How many weeks was the note to run if he was allowed 3 more days?

A stationer bought 12 dozen pens at \$0.05 a dozen, and sold them two for a cent. What did he gain?

In $\frac{1}{4}$ of an hour how many minutes?

If the horse-cars going the same way pass my house five times an hour, how often do they run? If they pass twelve times an hour, how often do they run?

If in going in one direction the cars pass every half hour, how often do they pass in going both directions?

If it takes a car twenty minutes to make a trip, and the cars pass each other half way on the trip, how often do the cars pass each other? If the two cars start at opposite ends of the route at the hour, at twenty minutes past the hour, and at twenty minutes of the hour, at what times through the day do they meet?

If a trip in the cars is 9 minutes long, how many minutes does it take the cars to make 8 trips? How many minutes over an hour?

If it is 9 minutes' ride in the cars out to Lakewood, how many minutes does it take a car to go four times? five times?

If the cook fries 72 oysters, thus allowing 9 oysters to each person at the table, how many persons are expected at table? If each person ate only 8 oysters, how many would be left for the cook?

If I have 72 pounds of flour, and use $\frac{3}{12}$ of it at each baking, for how many bakings will it be sufficient? How many pounds shall I use at each baking?

How many square feet in a square that is three feet on a side? If the square is three feet on a side, how many yards on a side is it? Then in a square yard how many square feet? In 9 square yards how many square feet?

In a square that is 9 yards on a side how many square yards? Which do you think is the larger area, 9 square yards or a square 9 yards on a side?

A pole 7 feet long is how many inches long?

A man 6 feet tall measures how many inches in height?

If 8 benches, each a foot from the floor, are piled top of each other, how much higher will they be than I, who am 5 feet and 6 inches? If I can reach up two feet above my height, how near can I come to reaching the top bench?

If a boy earns \$8.00 per month, what will he earn in a year? If he spends one-third of this sum for clothes, how much will he have left?

In one gallon how many gills?

In one bushel how many pints?

In one rod how many yards?

In one rod how many feet?

In one rod how many inches?

In one week how many hours?

In half a day how many minutes?

In an hour how many seconds?

-If 12 dozen pens are a gross of pens, how many pens in a gross?

In 16 pounds how many ounces?

A furlong is an eighth of a mile. How many rods are in a furlong?

It is $\frac{5}{8}$ of a mile to school. How many eighths less than a mile is it?

If you have $\frac{3}{4}$ of a dollar and spend $\frac{1}{4}$, how many fourths of a dollar have you left?

I ordered a pound of cheese, but the grocer cut off only $\frac{5}{8}$ of a pound. How much less than a pound did I get?

If the milliner uses $\frac{5}{9}$ of a yard of one kind of velvet in trimming a hat and $\frac{2}{9}$ of a yard of another kind of velvet, how much more of one kind does she use than of the other?

If I have $\frac{1}{2}$ of a dollar and you have $\frac{1}{4}$ of a dollar, how many more fourths have I than you?

If I buy $\frac{1}{2}$ of a pound of sugar and $\frac{1}{8}$ of a pound of tea, how much more sugar than tea do I buy?

Of $\frac{1}{2}$ a pound of meat, $\frac{1}{6}$ of a pound was fat and gristle. How many sixths of a pound was lean?

I had $\frac{1}{2}$ of a yard of smilax, but $\frac{1}{10}$ of a yard got broken off. How many tenths of a yard had I then?

I had a half-foot ruler, but my little brother whittled off of one end $\frac{1}{12}$ of a foot. How many twelfths of a foot long was my ruler then?

I had $\frac{1}{4}$ of a quire of paper, but have used $\frac{1}{8}$ of a quire of the paper. How many eighths of a quire have I now?

If you have $\frac{1}{4}$ of a ton of coal in a bin, and use $\frac{1}{12}$ of a ton, how many twelfths of a ton remain in the bin?

If you have $\frac{1}{3}$ of a bunch of envelopes, and use $\frac{1}{6}$ of a bunch, how many sixths of a bunch remain?

A basket and some grapes in the basket together weigh $\frac{1}{3}$ of a pound. If the basket weigh $\frac{1}{9}$ of a pound, how many ninths of a pound do the grapes weigh?

A boy, in carrying a measure which contained $\frac{1}{3}$ of a bushel of meal, spilt $\frac{1}{12}$ of a bushel. How many twelfths of a bushel were then in the measure?

It is $\frac{1}{6}$ of a mile across the green. $\frac{1}{12}$ of a mile is shaded. What part of a mile is not shaded?

If one furlong is $\frac{1}{8}$ of a mile, how many eighths of a mile are five furlongs?

If it takes $\frac{2}{3}$ of a yard of lace for one sleeve, how many sixths will it take for 2 sleeves? for 3? for 4? for 6?

If it is $\frac{2}{3}$ of a mile to town, and I walk the distance four times a day, how many thirds of a mile do I walk? how many miles?

If a man is 28 years old and his son is $\frac{1}{4}$ as old, how old is the son?

If you have collected four dozen stamps, of which one-fourth are foreign stamps, how many foreign stamps in your collection?

If a yard of cloth costs \$1.37, what will 7 yards cost?

If there were but 30 days in each month, how many days would there be in a year?

If I have 25 quarters of a dollar, what number of cents do I have?

I bought 19 yards of silk at \$0.75 a yard, and 3 yards of velvet at \$1.50 a yard. What was the amount of my bill?

What will 95 street lamps cost at \$11.00 each?

If a cannon-ball weighs 12 pounds, what will a dozen cannon-balls weigh?

If a bale of hay weighs 280 pounds, what will 65 bales weigh?

If your pulse beats 65 times a minute, how many times will it beat in an hour?

If from the sea to the base of a hill there is a rise of 425 feet, and the hill is 2 times as high as this rise, how far above the sea is the summit of the hill?

It is 160 rods across a pond, and three times as far around the pond; how many rods do I row if I cross the pond, go entirely round the pond, and then cross again to the place from which I started?

How many sheets of paper in a ream of paper?

In 100 pints how many quarts?

In 80 gills how many pints?

In 160 quarts how many gallons?

In 240 quarts how many pecks?

In 99 feet how many yards?

In a mile how many spaces, each 8 rods long, can you lay off?

If a man has a piece of ground containing 180 square feet, and it takes 9 square feet to make a square yard, how many square yards in his piece of ground?

If in a bed of plants there are 155 plants set out in rows with 5 plants in each row, how many rows of plants in the bed?

If a cord of wood is worth \$6, and 10 cords of wood are given for 12 thousand shingles, how much are the shingles a thousand?

A man bought an equal number of pigs and sheep for \$63. Each pig cost \$3, and each sheep \$4. How many of each did he buy?

A woman bought 24 yards of gingham at \$0.30 a yard, and 23 yards of cotton cloth at \$0.10 a yard. How much change did she receive out of a ten-dollar bill?

A man can do a piece of work in 4 days by working 12 hours a day. How many days will be required if he works only 8 hours a day?

A man can do a piece of work in 6 days by working 8 hours a day. How many hours a day must he work to finish it in 4 days?

Two men are 96 miles apart, and are travelling toward each other, one at the rate of 5 miles an hour, and the other at 3 miles an hour. In how many hours will they meet?

If 2 yards of silk cost \$4, what will 5 yards cost?

CHAPTER XXXVI.

FRACTIONS.

§ 77. REDUCTION OF FRACTIONS.

First Step. Reduce improper fractions to whole or mixed numbers. Thus, $\frac{2}{2} = 1$; $\frac{4}{4} = 1$; $\frac{8}{8} = 1$; $\frac{6}{2} = 3$; $\frac{7}{4} = 1\frac{3}{4}$.

Second Step. Reduce to equivalent fractions of higher terms. Thus, $\frac{1}{2} = \frac{2}{4}$; $\frac{1}{2} = \frac{3}{6}$; $\frac{1}{4} = \frac{2}{8}$; $\frac{1}{3} = \frac{2}{6}$.

Third Step. Reduce to equivalent fractions of lower terms. Thus, $\frac{2}{4} = \frac{1}{2}$; $\frac{3}{6} = \frac{1}{2}$; $\frac{2}{8} = \frac{1}{4}$; $\frac{2}{6} = \frac{1}{3}$.

Fourth Step. Reduce a whole or mixed number to an improper fraction. Thus, $2 = \frac{4}{2}$; $2 = \frac{6}{3}$; $2\frac{1}{2} = \frac{5}{2}$; $2\frac{2}{3} = \frac{8}{3}$.

Fifth Step. Reduce to least common denominator.

Exercise for Fourth Step.

If I get a two-dollar bill changed, receiving half-dollars for it, how many half-dollars shall I receive?

If you lend me 2 dollars, and I return the money in quarters, how many quarters must I give you?

If you cut 2 pies of equal size into eighths, how many eighths of a pie will you make?

If you cut two saucer pies into thirds, how many thirds of a pie will you make?

If you cut 2 yards of cloth into strips, each $\frac{1}{6}$ of a yard wide, how many strips will you have?

If a man puts two gallons of cider into bottles, each holding $\frac{1}{3}$ of a gallon, how many bottles will he use?

If we burn $\frac{1}{4}$ of a ton of coal a day, how long will 2 tons last us?

Express this number (2) in halves; in fourths; in eighths; in thirds; in sixths; in sevenths; in fifths; in ninths; in twelfths.

Express this number (4) in halves; in thirds; in fourths; in eighths.

Express any number you please in halves. Express the same number in other fractions.

If it is $2\frac{1}{2}$ miles to West Rock, how many halves of a mile is it to West Rock?

If I buy $2\frac{1}{3}$ yards of ribbon, how many thirds of a yard do I buy?

If you have a 2-dollar bill and a quarter of a dollar, and I have the same amount of money in quarters, how many quarters have I?

If I have $2\frac{1}{5}$ barrels of kindling wood, how many fifths of a barrel do I have?

If a strip of carpeting is $2\frac{1}{6}$ yards long, how many sixths of a yard in the strip?

Express $2\frac{1}{7}$ in sevenths.

Express $2\frac{1}{8}$ in eighths.

Express $2\frac{1}{9}$ in ninths.

Express $2\frac{1}{12}$ in twelfths.

Express the numbers I name, in halves: $4\frac{1}{2}$, $7\frac{1}{2}$, $10\frac{1}{2}$, $11\frac{1}{2}$.

Express in fourths: $3\frac{3}{4}$, $5\frac{3}{4}$, $6\frac{3}{4}$, $9\frac{3}{4}$, $11\frac{3}{4}$.

Express in thirds: $5\frac{1}{3}$, $5\frac{2}{3}$, $7\frac{1}{3}$, $7\frac{2}{3}$, $12\frac{2}{3}$, $11\frac{2}{3}$, $9\frac{2}{3}$.

Express in eighths: $2\frac{3}{8}$, $2\frac{5}{8}$, $5\frac{6}{8}$, $7\frac{7}{8}$, $9\frac{3}{8}$, $11\frac{4}{8}$, $12\frac{2}{8}$.

Express in sixths: $2\frac{3}{6}$, $3\frac{5}{6}$, $4\frac{5}{6}$, $6\frac{4}{6}$.

Express in fifths: $2\frac{3}{5}$, $3\frac{2}{5}$, $8\frac{3}{5}$, $9\frac{4}{5}$.

Express in sevenths: $2\frac{4}{7}$, $3\frac{5}{7}$, $4\frac{6}{7}$, $5\frac{5}{7}$, $6\frac{3}{7}$.

Exercise for Fifth Step.

I bought $\frac{1}{2}$ of a yard of one kind of satin and $\frac{1}{3}$ of a

yard of another kind of satin. Who can tell me in sixths what part of a yard of each kind I bought?

If I pay $\frac{1}{2}$ of a dollar for a book and $\frac{1}{5}$ of a dollar for some note paper, how many tenths of a dollar do I pay for each?

If I have $\frac{1}{2}$ of a cord of hard wood and $\frac{1}{7}$ of a cord of kindling wood, how many fourteenths of a cord of each kind do I have?

If you are in one school $\frac{1}{2}$ of the year and in another $\frac{1}{3}$ of a year, how many eighteenthths of a year are you in each school?

Who will express on the board $\frac{1}{2}$ and $\frac{1}{3}$ in fractions having their denominators alike?

Who will express $\frac{1}{2}$ and $\frac{1}{5}$ in fractions having their denominators alike? $\frac{1}{2}$ and $\frac{1}{7}$? $\frac{1}{2}$ and $\frac{1}{9}$?

Who will express $\frac{1}{3}$ and $\frac{1}{4}$ in fractions having their denominators alike? $\frac{1}{3}$ and $\frac{1}{5}$? $\frac{1}{4}$ and $\frac{1}{5}$? $\frac{1}{4}$ and $\frac{1}{6}$? $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{6}$? $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$? $\frac{1}{2}$, $\frac{1}{5}$, and $\frac{1}{10}$? $\frac{1}{2}$, $\frac{1}{6}$, and $\frac{1}{12}$? $\frac{1}{2}$, $\frac{1}{7}$, and $\frac{1}{14}$? $\frac{1}{3}$, $\frac{1}{4}$, and $\frac{1}{6}$? $\frac{1}{6}$ and $\frac{1}{9}$? $\frac{1}{3}$, $\frac{1}{6}$, and $\frac{1}{9}$? $\frac{1}{3}$, $\frac{1}{6}$, and $\frac{1}{12}$? $\frac{1}{3}$, $\frac{1}{5}$, and $\frac{1}{15}$?

When you change fractions to other fractions whose denominators are alike, we say that you *reduce the fractions to fractions having a common denominator*. When you changed $\frac{1}{2}$ and $\frac{1}{3}$ to $\frac{2}{6}$ and $\frac{2}{6}$, you reduced $\frac{1}{2}$ and $\frac{1}{3}$ to equivalent fractions having a common denominator. When you changed $\frac{1}{2}$ and $\frac{1}{5}$ to tenths, what do we say you did? When you changed $\frac{1}{3}$ and $\frac{1}{4}$ to twelfths, what did you do? When I ask you to reduce $\frac{1}{2}$ and $\frac{1}{7}$ to fractions having a common denominator, to what will you change the fractions? When you reduce $\frac{1}{3}$, $\frac{1}{2}$, and $\frac{1}{6}$ to fractions having a common denominator, to what will you change the fractions?

Reduce to fractions having a common denominator $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{4}$; $\frac{1}{3}$, $\frac{1}{6}$, and $\frac{1}{9}$; $\frac{1}{2}$ and $\frac{2}{3}$; $\frac{2}{3}$ and $\frac{1}{4}$; $\frac{2}{3}$, $\frac{2}{6}$, and $\frac{1}{12}$; $\frac{2}{3}$, $\frac{1}{2}$, and $\frac{2}{3}$.

§ 78. ADDITION OF FRACTIONS.

First Step. Add fractions whose denominators are alike and whose sum is less than one. Thus, $\frac{2}{8} + \frac{2}{8}$; $\frac{1}{3} + \frac{1}{3}$; $\frac{2}{4} + \frac{1}{4}$; $\frac{1}{5}, \frac{2}{5}, \frac{1}{5}$; $\frac{1}{6}, \frac{2}{6}, \frac{2}{6}$.

Second Step. Add fractions whose denominators are unlike, but whose least common denominator is found in one of the fractions to be added. Thus, $\frac{1}{2} + \frac{1}{4}$; $\frac{1}{2} + \frac{1}{8}$; $\frac{1}{4} + \frac{1}{8}$; $\frac{1}{8} + \frac{1}{6}$; $\frac{1}{2} + \frac{1}{6}$; $\frac{1}{2} + \frac{1}{4} + \frac{1}{8}$; $\frac{1}{8} + \frac{1}{6} + \frac{1}{12}$; $\frac{2}{3} + \frac{2}{3}$.

Third Step. Add fractions whose denominators are unlike and whose least common denominator is not found in any one of the fractions to be added. Thus, $\frac{1}{2} + \frac{1}{3}$; $\frac{1}{3} + \frac{1}{5}$.

Fourth Step. Add mixed numbers. Thus, $3\frac{1}{2} + 5\frac{1}{4}$.

Exercise for Third Step.

It takes $\frac{1}{2}$ of a yard of lace for my sleeves, and $\frac{1}{3}$ of a yard for my collar. I want you to find what part of a yard it takes for both neck and sleeves. Who can tell me the least common denominator of $\frac{1}{2}$ and $\frac{1}{3}$? Then give me your answer in sixths.

A man earns $\frac{1}{2}$ of a dollar an hour, and his son earns $\frac{1}{5}$ of a dollar an hour. What part of a dollar do they earn together? What is the least common denominator of $\frac{1}{2}$ and $\frac{1}{5}$? Then find your answer in tenths.

It is $\frac{1}{3}$ of a mile to the post-office and $\frac{1}{4}$ of a mile farther to the depot. What part of a mile is the distance to the depot? To what will you reduce the fractions? What is your number of twelfths?

Find the sum of $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{8}$. What is the least common denominator?

Find the sum of $\frac{1}{2}$, $\frac{1}{3}$, and $\frac{1}{5}$.

Find the sum of $\frac{1}{3}$, $\frac{1}{6}$, and $\frac{1}{9}$.

Find the sum of $\frac{1}{2}$, $\frac{1}{6}$, and $\frac{1}{9}$.

Find the sum of $\frac{1}{2}$ and $\frac{4}{9}$.

Find the sum of $\frac{1}{8}$ and $\frac{3}{4}$; $\frac{1}{4}$ and $\frac{2}{5}$.

Find the sum of $\frac{2}{3}$, $\frac{1}{4}$, and $\frac{1}{6}$; $\frac{5}{6}$ and $\frac{2}{9}$.

Exercise for Fourth Step.

In one piece of trimming there are $4\frac{1}{2}$ yards, and in another piece of the same trimming there are $11\frac{1}{8}$ yards. I want you to find how many yards there are in both pieces. You may add your fractions *first* in all such numbers. What is the sum of the fractions? What is the sum of the other numbers? What is the entire sum?

Try if you can add $19\frac{1}{3}$ and $17\frac{1}{4}$; $15\frac{1}{5}$ and $75\frac{1}{3}$; $12\frac{1}{6}$ and $9\frac{1}{9}$; $8\frac{2}{3}$ and $7\frac{1}{9}$; $9\frac{1}{4}$ and $6\frac{2}{5}$; $5\frac{1}{2}$ and $9\frac{3}{7}$.

§ 79. SUBTRACTION OF FRACTIONS.

First Step. Subtract fractions having like denominators. Thus, $\frac{3}{4} - \frac{1}{4}$; $\frac{6}{8} - \frac{3}{8}$; $\frac{4}{7} - \frac{3}{7}$; $\frac{5}{9} - \frac{2}{9}$.

Second Step. Subtract fractions whose denominators are unlike, but whose least common denominator is found in one of the given fractions. Thus, $\frac{1}{2} - \frac{1}{4}$; $\frac{2}{3} - \frac{1}{6}$; $\frac{3}{4} - \frac{1}{2}$.

Third Step. Subtract fractions whose denominators are unlike, but whose least common denominator is not found in any one of the given fractions. Thus, $\frac{1}{2} - \frac{2}{5}$; $\frac{1}{2} - \frac{3}{7}$.

Fourth Step. Subtract one mixed number from another.

Exercise for Third Step.

From $\frac{1}{2}$ of a barrel of vinegar I have drawn off $\frac{1}{3}$ of a barrel of vinegar. What part of a barrel of vinegar remains?

What must you do before you can find the difference between $\frac{1}{2}$ and $\frac{1}{3}$? What is the least common denominator? What do you find your answer to be?

A book which I bought cost $\frac{1}{3}$ of a dollar. I paid for it with $\frac{1}{2}$ of a dollar. What part of a dollar ought I to receive in change?

Find the difference between $\frac{2}{3}$ and $\frac{1}{2}$.

Find the difference between $\frac{3}{4}$ and $\frac{1}{8}$.

Find the difference between $\frac{4}{5}$ and $\frac{1}{2}$.

Find the difference between $\frac{5}{7}$ and $\frac{1}{2}$; $\frac{2}{3}$ and $\frac{1}{6}$.

Find the difference between $\frac{2}{3}$ and $\frac{3}{5}$; $\frac{4}{5}$ and $\frac{3}{4}$.

Exercise for Fourth Step.

There were $2\frac{1}{3}$ yards cut from a pole which was a rod in length. I wish to know how many yards in length the pole was then. If only $\frac{1}{3}$ of a yard had been taken from $5\frac{1}{2}$ yards, how long would the pole be? If 2 yards more were cut off, what then remained? How long then was the pole that lacked $2\frac{1}{3}$ yards of being a rod long?

If a room is $10\frac{5}{8}$ feet high, and the bordering and dado take up $4\frac{1}{2}$ feet, what is the distance between the bordering and the dado? Find first what would be the distance if only $\frac{1}{2}$ foot were taken up. Find next what was the distance when 4 more feet were taken.

Find the difference between $8\frac{2}{3}$ and $3\frac{1}{3}$; $72\frac{3}{4}$ and $19\frac{1}{5}$; $70\frac{7}{8}$ and $15\frac{1}{4}$; $63\frac{3}{8}$ and $29\frac{1}{8}$; $85\frac{5}{8}$ and $27\frac{3}{4}$; $62\frac{6}{7}$ and $37\frac{1}{8}$.

§ 80. MULTIPLICATION OF FRACTIONS.

First Step. Multiply a fraction by an integer. Thus, 2 times $\frac{3}{5}$; 3 times $\frac{2}{6}$; 3 times $\frac{5}{7}$.

Second Step. Find fractional parts of numbers. Thus, $\frac{1}{2}$ of 16; $\frac{2}{3}$ of 12; $\frac{3}{5}$ of 20; $\frac{3}{4}$ of 24; $\frac{5}{6}$ of 30; $\frac{4}{7}$ of 28.

Third Step. Multiply one fraction by another when the operation can be performed by dividing the numerator of the multiplicand by the denominator of the multiplier. Thus, $\frac{1}{2}$ of $\frac{4}{7}$; $\frac{1}{2}$ of $\frac{6}{9}$; $\frac{1}{3}$ of $\frac{9}{11}$; $\frac{1}{4}$ of $\frac{8}{9}$; $\frac{1}{5}$ of $\frac{15}{8}$.

I had $\frac{6}{8}$ of a dollar, and spent $\frac{1}{2}$ of what I had. Let us find how many eighths of a dollar I spent. If the eighths of a dollar had been whole dollars, and I spent $\frac{1}{2}$ of it, how many dollars should I have spent? If $\frac{1}{2}$ of 6 dollars is 3 dollars, then $\frac{1}{2}$ of $\frac{6}{8}$ is how many eighths?

If I cut $\frac{8}{9}$ of a yard of ribbon into 4 equal parts, how many ninths of a yard were in each part? If I had cut 8 yards of ribbon into 4 equal parts, how many yards would there be in each part? If $\frac{1}{4}$ of 8 yds. = 2 yds., then $\frac{1}{4}$ of $\frac{8}{9}$ will equal how many ninths?

$\frac{1}{3}$ of $\frac{6}{7}$ equals how many sevenths?

$\frac{1}{3}$ of $\frac{9}{11}$ equals how many elevenths?

$\frac{1}{3}$ of $\frac{12}{13}$ equals how many thirteenths?

$\frac{1}{4}$ of $\frac{8}{11}$ equals how many elevenths?

$\frac{1}{4}$ of $\frac{16}{18}$ equals how many eighteenths?

$\frac{1}{6}$ of $\frac{20}{21}$ equals how many twenty-firsts?

$\frac{1}{6}$ of $\frac{18}{20}$ equals how many twentieths?

$\frac{1}{7}$ of $\frac{24}{24}$ equals how many twenty-fourths?

§ 81. DIVISION OF FRACTIONS.

First Step. Divide fractions when the denominators are alike, and the numerator of the dividend is exactly divisible by the numerator of the divisor. Thus, $\frac{6}{8} \div \frac{3}{8}$; $\frac{9}{14} \div \frac{3}{14}$.

Second Step. Divide fractions when the denominators are alike, but the numerator of the dividend is not exactly divisible by the numerator of the divisor. Thus, $\frac{7}{8} \div \frac{3}{8}$.

Exercise for First Step.

I have here an orange cut into 12 equal parts. To how many children can you give $\frac{9}{12}$ of an orange, if you give $\frac{3}{12}$ to each child? In $\frac{9}{12}$ then how many times $\frac{3}{12}$?

John, you may take $\frac{8}{12}$ of the orange, and give $\frac{2}{12}$ to each child until you have none left. To how many children did you give $\frac{8}{12}$, giving $\frac{2}{12}$ to each child? How many times is $\frac{2}{12}$ found in $\frac{8}{12}$?

Annie, you may take $\frac{10}{12}$, and find how many times $\frac{5}{12}$ is found in $\frac{10}{12}$. Find how many times $\frac{2}{12}$ is found in $\frac{10}{12}$.

How many times is $\frac{2}{12}$ found in $\frac{6}{12}$? $\frac{4}{12}$ in $\frac{8}{12}$? $\frac{1}{12}$ in $\frac{9}{12}$? $\frac{6}{12}$ in $\frac{12}{12}$?

If I have $\frac{8}{9}$ of a dollar, and buy crackers at $\frac{2}{9}$ of a dollar a pound, how many pounds do I buy? If the crackers were $\frac{4}{9}$ of a dollar a pound, how many pounds could I buy?

If I have $\frac{8}{18}$ of a lb. of coffee, and I use $\frac{2}{18}$ each day, how many days will the coffee last? If I use only $\frac{1}{18}$ of a lb. a day, how many days will the coffee last? If I use $\frac{4}{18}$ a day, how many days will $\frac{8}{18}$ last?

If it takes me $\frac{2}{60}$ of an hour to write a line, how many times can I write the line in $\frac{24}{60}$ of an hour? If it takes me $\frac{3}{60}$ of an hour, how many times can I write the line? If it takes me $\frac{4}{60}$ of an hour to write a long line, how many times can I write it in $\frac{24}{60}$ of an hour? If James can copy his spelling in $\frac{3}{60}$ of an hour, how many times can he copy his spelling in $\frac{24}{60}$ of an hour? If it takes Nellie $\frac{8}{60}$ of an hour, how many times can she copy her words in $\frac{24}{60}$ of an hour? If it takes a car $\frac{12}{60}$ of an hour to make a trip, how many trips can the car make in $\frac{24}{60}$ of an hour?

Divide $\frac{6}{11}$ by $\frac{2}{11}$; $\frac{8}{9}$ by $\frac{2}{9}$; $\frac{10}{18}$ by $\frac{5}{18}$; $\frac{12}{15}$ by $\frac{3}{15}$.

Exercise for Second Step.

It takes $\frac{2}{3}$ of a yard of cloth for an apron. Who will tell me how many aprons I can make from $\frac{7}{3}$ of a yard? (3.) What part of a yard will remain after I take enough for 3 aprons? What part of enough for an apron is $\frac{1}{3}$ of a yard? How many aprons and what part of an apron can I make from $\frac{7}{3}$ of a yard, if it takes $\frac{2}{3}$ of a yard for each apron?

My bottle of ink is $\frac{9}{12}$ full. If I use $\frac{2}{12}$ of a bottle each month, how many months will the ink last me? (4 months.) At the end of four months, what part of a bottle of ink will remain? ($\frac{1}{12}$.) What part of a month will $\frac{1}{12}$ last me, if I use $\frac{2}{12}$ each month? How many months and what part of a month will $\frac{9}{12}$ of a bottle of ink last, if I use $\frac{2}{12}$ each month?

How much cake can I make from $\frac{10}{12}$ of a dozen eggs, if $\frac{4}{12}$ of a dozen are required for each pound of cake?

If a boy earns $\frac{3}{10}$ of a dollar a day, in what time will he earn $\frac{29}{10}$ of a dollar?

If a ship sails $\frac{5}{28}$ of a mile in a minute, in what time will it sail $\frac{34}{8}$ of a mile?

If a pound of coffee costs $\frac{6}{15}$ of a dollar, what amount of coffee can I buy for a dollar?

If crackers are $\frac{7}{20}$ of a dollar a pound, what amount of crackers can be bought for a dollar?

Divide $\frac{7}{9}$ by $\frac{2}{9}$; by $\frac{3}{9}$; by $\frac{4}{9}$; by $\frac{5}{9}$.

Divide $\frac{8}{11}$ by $\frac{3}{11}$; by $\frac{4}{11}$; by $\frac{5}{11}$; by $\frac{6}{11}$.

Divide $\frac{15}{19}$ by $\frac{4}{19}$; by $\frac{5}{19}$; by $\frac{7}{19}$; by $\frac{9}{19}$.

Exercise for Review.

A slate pencil and a lead pencil together cost 4 cents. If the lead pencil cost three times as much as the slate pencil, what did each pencil cost?

A slate and a pencil together cost 9 cents. What did each cost, if the slate cost twice as much as the pencil?

A piece of baize for a desk cover and the braid to bind it, together cost 15 cents. If the braid cost only half as much as the baize, what did each cost?

I bought some pens and a penholder for 12 cents. The penholder cost twice as much as the pens. What did the pens cost?

I bought some stamps and an envelope for 10 cents. The stamps cost four times as much as the envelope. How much did each cost?

An apple and a peach together cost 6 cents. The peach cost twice as much as the apple. What did the apple cost?

Suppose you and I are 20 rods apart, and you gain upon me 2 rods every minute. How long before you will overtake me? If I can walk 20 rods in a minute, how far shall I walk while you are catching up to me? How far will you walk? How many more rods must I walk to go a mile?

If a bicycle goes 9 miles while I am walking 3 miles, how many times as fast as I does the bicycle go? While I am walking 2 miles, how far will the bicycle go? If the bicycle and I start together, and I go a mile and return, how many miles can the bicycle go and return in the same time?

If you are 9 years old and I am 21 years old, how old will each of us be when I am just twice as old as you?

If it costs 25 cents to send a telegram consisting of 10 words, and 2 cents for each additional word, what will it cost to send a message of 15 words?

If it costs \$5.00 for a table 6 feet long, and 50 cents for every additional foot, how much must I pay for a table 10½ feet long?

If it takes 2 hours to roast a turkey weighing 10 pounds, and 15 minutes more for every additional pound, how long will it take to roast a turkey weighing 14 pounds?

How many tiles 4 inches square will it take to cover a space 16 inches square?

A meter is $39\frac{3}{8}$ inches. What is the difference in length between a yard and a meter? between 2 yards and 2 meters?

If you have $\frac{1}{2}$ of a dollar, and I have $\frac{1}{4}$ of a dollar, how many pounds of candy can we buy at $\frac{1}{4}$ of a dollar a pound?

If one man owns $\frac{1}{2}$ of a building lot and another man owns $\frac{3}{8}$ of the lot, how much of the building lot do both men own?

If I ride $\frac{1}{2}$ of a mile and walk $\frac{1}{8}$ of a mile, what part of a mile do I go?

If you study one lesson $\frac{1}{2}$ of an hour and another lesson $\frac{1}{10}$ of an hour, what part of an hour do you spend studying?

If there is $\frac{1}{2}$ of a dozen buttons on one card, $\frac{1}{4}$ of a dozen on another card, and $\frac{1}{8}$ of a dozen on yet another card, what part of a dozen is on all the cards together?

If I have $\frac{1}{2}$ of a card of matches and $\frac{1}{3}$ of a card, what part of a card have I all together?

If you have $\frac{1}{2}$ of a dollar and I have $\frac{1}{5}$ of a dollar, how much money have we together?

What is the sum of $\frac{1}{3}$ and $\frac{5}{9}$? $\frac{1}{3}$ and $\frac{5}{6}$? $\frac{2}{3}$ and $\frac{1}{9}$? $\frac{2}{3}$ and $\frac{3}{4}$? $\frac{2}{3}$, $\frac{1}{4}$, and $\frac{5}{6}$? $\frac{2}{3}$ and $\frac{2}{5}$? $\frac{5}{6}$ and $\frac{2}{9}$?

If for dinner we eat $\frac{1}{2}$ and $\frac{1}{3}$ of a melon, what part of the melon is left?

I bought $\frac{5}{8}$ of a peck of sweet potatoes, and we have eaten $\frac{1}{2}$ of a peck. What part of a peck remains? How many more eighths of a peck must I have to make a whole peck?

If my bottle of ink is half full, and I use $\frac{2}{5}$ of a bottle of ink, what part of a full bottle will remain?

If from $\frac{3}{4}$ of a cask of vinegar $\frac{2}{3}$ of the cask is drawn off, what part of a full cask remains? If the cask holds 48 gallons, how many gallons remain in the cask?

If $\frac{1}{2}$ of a bushel of corn is taken from a basket holding $\frac{3}{5}$ of a bushel, what part of a bushel will remain?

What is the difference between $\frac{2}{3}$ and $\frac{2}{5}$? $\frac{4}{5}$ and $\frac{3}{4}$? $\frac{3}{5}$ and $\frac{1}{2}$? $\frac{3}{5}$ and $\frac{5}{6}$?

If you earn $\frac{2}{3}$ of a dollar a week, how much will you earn in 6 weeks? in 9 weeks? in 11 weeks?

How much will 6 books cost at $\frac{3}{4}$ of a dollar a book? at $\frac{2}{5}$ of a dollar a book? at $\frac{1}{2}$ of a dollar a book?

In one bunch of bananas there were 20 bananas. When $\frac{3}{5}$ of the bunch have been sold, how many bananas have been sold?

If a yard of cloth costs 48 cents, what must I pay for $\frac{3}{4}$ of a yard?

When apples are 60 cents a bushel, what must you pay for $\frac{7}{10}$ of a bushel?

In $\frac{5}{9}$ of a yard how many inches?

In $\frac{4}{5}$ of an hour how many minutes?

In $\frac{5}{8}$ of a bushel how many quarts?

A man cut $\frac{8}{9}$ of a cord of wood in a day, and his son cut $\frac{1}{2}$ as much. How many ninths did the son cut?

I have $\frac{9}{12}$ of a dozen eggs in one basket and $\frac{1}{3}$ as many eggs in another basket. What part of a dozen have I in the second basket?

In our back yard there are $\frac{6}{7}$ of an acre of land, and in the front yard there is only $\frac{1}{2}$ as much land. How many sevenths of an acre in the smaller yard?

I have a piece of ribbon $\frac{6}{9}$ of a yard long. If I cut off $\frac{1}{3}$ of the ribbon, what part of a yard shall I cut off?

I had in my purse $\frac{8}{12}$ of a dollar, but I spent $\frac{1}{4}$ of my money. What part of a dollar did I spend?

What is $\frac{1}{5}$ of $\frac{10}{11}$? $\frac{1}{5}$ of $\frac{5}{6}$? $\frac{1}{5}$ of $\frac{5}{15}$?

What is $\frac{1}{6}$ of $\frac{12}{5}$? $\frac{1}{6}$ of $\frac{8}{6}$? $\frac{1}{6}$ of $\frac{24}{6}$?

When apples are $\frac{2}{5}$ of a dollar a peck, how many pecks can I buy for $\frac{4}{5}$ of a dollar?

If we use $\frac{2}{3}$ of a pound of butter at a meal, for how many meals will $\frac{8}{9}$ of a pound be sufficient?

If we use $\frac{3}{10}$ of a pound of coffee in a day, in how many days shall we use $\frac{9}{10}$ of a pound?

If I eat $\frac{5}{11}$ of a pound of meat each meal, how many meals will $\frac{10}{11}$ of a pound last me?

If ice forms at the rate of $\frac{2}{18}$ of an inch an hour, how long will it take for the ice to be an inch thick? 6 inches thick? 9 inches thick? a foot thick?

If a vine grows $\frac{9}{10}$ of an inch a day, how many days will it take the vine to grow 9 inches?

A drover paid \$200 for lambs at \$5.00 apiece. How many lambs did he buy?

A man paid \$2.10 for eggs at \$0.30 a dozen. How many dozen of eggs did he buy?

I bought 3 bookcases, one for \$35.00, one for \$12.00, and one for \$8.00, and paid \$5.00 for having them var-

nished. At the end of 5 years I sold them for \$30.00. If they were worth \$6.00 a year to me while I had them, did I gain or lose?

I bought 40 yards of carpeting for \$0.75 a yard, and after using the carpet 5 years I sold it for \$15.00. If the carpet was worth \$3.00 a year to me, did I gain or lose?

A man bought a second-hand chamber set for \$25.00, and paid \$3.00 to put it in good order, then sold it for \$40.00. How much did he make?

If it takes \$84.00 to furnish a school-room with seats at \$2.00 each, how many are put into the room?

If the uniforms for a company of boys cost \$189.00, at \$3.00 each, how many boys are in the company?

If a merchant sells \$168.00 worth of boots in a week, at \$4.00 a pair, how many pairs does he sell? What does he gain at 25 cents a pair?

A man sold $\frac{4}{5}$ of a piece of cotton cloth which contained 45 yards. How many yards did he sell? How many yards were left?

A horse cost \$200, and a sleigh $\frac{2}{5}$ as much. What did the sleigh cost?

A man owned $\frac{3}{4}$ of a ship, and sold $\frac{1}{5}$ of his share. How many sixty-fourths had he left?

John had $\frac{4}{5}$ of a dollar, and George and Charles had each $\frac{7}{10}$ of a dollar. How much more had George and Charles together than John?

How many dollars will 3 barrels of flour cost at \$6 $\frac{2}{3}$ a barrel?

If 2 yards of cloth cost \$8 $\frac{4}{5}$, what is the price per yard?

How many pints in 12 $\frac{1}{2}$ gallons? How many gallons in 168 pints?

How many pecks in 248 quarts? How many bushels?

If a locomotive can go 8 miles in $\frac{1}{5}$ of an hour, how many miles can it go in one hour and a half?

CHAPTER XXXVII.

FACTORS.

§ 82. A FACTOR OF A NUMBER.

Name a number that will divide six without a remainder.
(2.)

Two is a *factor* of six.

Name another number that will divide six without a remainder. (3.)

Three is a factor of six.

Name another factor of six. (1.)

Name another factor of six. (6.)

Name a factor of *twelve*. (3.)

Name another factor of twelve. (4.)

Name another factor of twelve. (6.)

Name another factor of twelve. (2.)

Name the two remaining factors of twelve. (1 and 12.)

Name the factors of fifteen; of eight; of sixteen; of twenty; of twenty-four; of thirty-six; of forty-eight; of seventy-two.

What have you been naming of numbers?

What is true of a factor of a number?

§ 83. PRIME AND COMPOSITE NUMBERS.

What are the factors of seven? three? eleven? five? thirteen? seventeen? twenty-three? twenty-nine? thirty-one? forty-one?

Name another number of which the factors are simply *one* and the number itself; another; another.

Beginning with one, write in order a dozen numbers whose factors are simply one and the number itself.

Describe these numbers with reference to their factors.

All such numbers are **prime** numbers.

Describe a prime number. Name a number that has other factors as well as one and itself. Who thinks of three such numbers?

Write a score of such numbers.

Describe these numbers with reference to their factors.

All such numbers are **composite** numbers.

Describe a composite number. I will name the numbers from one to thirty, and you may describe each by saying prime or composite as I name.

Are most numbers prime or composite?

§ 84. PRIME FACTORS OF A NUMBER.

Name a prime number that is a factor of twelve. (2.)

Two is a **prime factor** of twelve.

Name another prime number that is a factor of twelve. (3.)

Three is a prime factor of twelve. Name a prime factor of sixteen; of eighteen.

Name two prime factors of twenty-one; of twenty-four; of twenty-eight; of thirty-six; of thirty-five.

What kind of factors have you been naming?

What do you mean by a prime factor of a number?

Write the prime numbers whose product is six; whose product is eight; whose product is twelve; whose product is sixteen; whose product is eighteen; whose product is twenty; whose product is twenty-four.

You have expressed the prime factors of these numbers.

Express the prime factors of thirty; of thirty-two; of thirty-six; of twenty-eight; of twenty-seven.

Complete this work:

The prime factors of 40 =

The prime factors of 42 =

The prime factors of 45 =

The prime factors of 44 =

The prime factors of 48 =

The prime factors of 49 =

The prime factors of 50 =

The prime factors of 54 =

The prime factors of 56 =

The prime factors of 60 =

The prime factors of 63 =

The prime factors of 64 =

The prime factors of 66 =

The prime factors of 70 =

The prime factors of 72 =

Find the product of the factors of each number, and see if the product is the number itself.

What are the prime factors of any number?

§ 85. A COMMON FACTOR OF TWO OR MORE NUMBERS.

Name a factor of four that is also a factor of six. (2.)

Two is a *common* factor of four and six.

Name a factor of four that is a factor of six, eight, and ten. (2.)

Two is a common factor of four, six, eight, and ten.

Name a factor of six that is a factor of nine and of twelve. (3.)

Three is a common factor of six, nine, and twelve.

Name a common factor of eight and twelve.

Name a common factor of six, nine, and eighteen.

Name a common factor of seven, fourteen, and twenty-one.

Name a common factor of ten, fifteen, and twenty-five.

Name a common factor of nine, twelve, fifteen, and twenty-four.

What is true of a common factor of two or more numbers?

Name all the factors common to six and twelve.

Which of these common factors is the greatest number?

Six is the greatest common factor of six and twelve.

Name all the factors common to twelve and twenty-four.

Which of these common factors is the greatest number?

Twelve is the greatest common factor of twelve and twenty-four.

Name all the factors common to eight, twelve, and twenty.

Which of these common factors is the greatest number?

What is four, then, of eight, twelve, and twenty?

Name the greatest common factor of six, twelve, and eighteen; of ten, twenty, and thirty; of eighteen and thirty-six; of fourteen and twenty-eight; of sixteen and twenty-four; of twenty-four, thirty, and thirty-six.

What is the greatest common factor of two or more numbers?

§ 86. A MULTIPLE OF A NUMBER.

Name a number of which two is a factor. (4.)

Four is a multiple of two.

Name another number of which two is a factor. (8.)

Eight is a multiple of two.

Name another multiple of two; another; another.

Beginning with four, write the multiples of two as far as thirty.

Write the multiples of three as far as thirty.

Write the multiples of four as far as forty.

Write three multiples of five; of six; of seven; of eight; of nine; of ten.

What have you been writing?

What do you mean by a multiple of a number?

§ 87. A COMMON MULTIPLE OF GIVEN NUMBERS.

Name a multiple of two that is also a multiple of four.
(8.)

Eight is a common multiple of two and four.

Name another common multiple of two and four; another; another.

Name a common multiple of two, three, and four; of two, four, and five; of two, four, and six; of three and five; of three and seven; of six and nine; of two, three, four, six, eight, and twelve; of two, three, four, six, nine, twelve, and eighteen.

What do you mean by a common multiple of two numbers?

Name the smallest number that is a common multiple of two and three. (6.)

Six is the least common multiple of two and three.

Name the least common multiple of three and four; of two and five; of two and seven; of three and five; of two and four; of three and six; of four and eight; of four and six; of six and twelve; of four and seven.

Name the least common multiple of two, four, and eight; of three, six, and twelve; of three, four, and six; of two, four, and five; of two, five, and ten; of three, five, and ten; of four, five, and ten; of two, six, and ten; of three, six, and ten.

Exercise for Review.

Express the factors of 12; of 18; of 24; of 36.

Point to the row of numbers which have 12 for a multiple.

Point to the row of numbers which have 24 for a multiple.

Point to the row of numbers which have 36 for a multiple.

Point to the row of numbers which have 18 for a multiple.

Draw a line through each number that is not found in *all* the rows.

What word will describe the factors that remain with reference to 12, 18, 24 and 36?

What word will describe 6 as a common factor of these numbers?

Try in the same way to find the greatest common factor of 14, 28, and 42.

Find the greatest common factor of 16, 24, 40, and 48.

Find the greatest common factor of 20, 40, 60, and 80.

Find the greatest common factor of 25, 50, and 75.

I have cloth out of which I wish to cut squares for a patchwork quilt. The cloth is of three widths: 12 inches, 18 inches, and 24 inches. What are the largest squares I can get without any waste of cloth?

A gardener has a rectangular flower-bed which is 6 feet on each of two sides, 8 feet on each of the other two sides, and 10 feet from corner to corner. If he borders this flower-bed with plants at equal distances apart, and sets them across the diagonals at the same distance apart, what is the greatest distance at which they can be placed from each other?

If the lengths of the sides and diagonal were 4, 3, and 5

respectively, what would be the greatest distance at which plants could be placed to be the same distance apart?

If the lengths were 12, 16, and 20, what would be the greatest distance?

If the lengths were 24, 32, and 40, what would be the greatest distance?

I have some paper which is 9 inches wide, some which is 12 inches wide, and some which is 15 inches wide, which I wish to cut into strips of equal width. What can be the greatest width of the strips so as to have no waste of the paper?

Write the numbers in order from 1 to 30.

Draw a line through each *odd* number.

Place a dot over each *prime* number.

Is every odd number a prime number?

What even number is a prime number?

What word will describe all numbers not prime?

Are all composite numbers even numbers?

Are all even numbers composite numbers?

Are there more composite numbers than even numbers?

Name the prime factors of 6, 8, 9, 12, 18, 20, 24.

Divide 48 by one of its prime factors. Divide the answer by a prime factor. Go on dividing by prime factors until the answer is a prime number. Find the product of the last answer and the several divisors. What is the answer?

What then are the prime factors of 48?

In the same way find the prime factors of:

72	148	196	289
144	200	225	324
96	169	256	400

Write in a row the multiples of 2 as far as 30.

Write the multiples of 3 as far as 30.

Write the multiples of 4 as far as 28.

Draw a line through every multiple not found in all the rows.

What word will describe the remaining multiples with reference to 2, 3, and 4?

What word will describe 12 as a common multiple of 2, 3, and 4?

Write the multiples of 6, 9, and 4 until you find the least common multiple of the numbers.

Find the least common multiple of 2, 3, 4, and 8.

Find the least common multiple of 3, 5, and 2.

Find the least common multiple of 4, 5, and 8.

I have here several disks of paper. You will see that one is divided into halves, another into thirds, another into fourths, and so on, each being divided into a certain number of equal parts.

I wish you to show me $\frac{1}{2}$ and $\frac{1}{4}$ of the same disk. Which disk will you choose? (The one divided into fourths.)

Which disk will you choose to show me $\frac{1}{2}$ and $\frac{1}{3}$ of the same one? (The one divided into sixths.)

Which disk will you choose to show me $\frac{1}{3}$, $\frac{1}{4}$, and $\frac{1}{6}$?

Which disk to show me $\frac{1}{2}$ and $\frac{1}{5}$?

Which disk to show me $\frac{1}{3}$ and $\frac{1}{5}$?

Which disk to show me $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{4}$, $\frac{1}{6}$, and $\frac{1}{12}$?

Which disk to show me $\frac{1}{2}$, $\frac{1}{7}$, and $\frac{1}{14}$?

Which disk to show me $\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{8}$, and $\frac{1}{16}$?

Which disk to show me $\frac{1}{2}$, $\frac{1}{3}$, $\frac{1}{6}$, and $\frac{1}{9}$?

Which disk to show me $\frac{1}{2}$, $\frac{1}{4}$, and $\frac{1}{5}$?

I have blocks which are 3, 4, and 6 inches long. What must be the length of the shortest box into which they exactly fit?

Find the shortest length of plank that I must buy if I wish to cut it into pieces 3 feet, 6 feet, or 9 feet long, so that there will be no waste.

Find the narrowest width of cloth that I must buy if I wish to cut it into 2 inch squares, 3 inch squares, 4 inch squares, 6 inch squares, 8 inch squares, or 12 inch squares, without any waste.

CHAPTER XXXVIII.

DECIMALS.

§ 88. TENTHS.

Name a fraction whose denominator is ten. Express the fraction on the board. ($\frac{3}{10}$.)

I will express the same fraction. (0.3.)

Read what I have expressed.

Name another fraction whose denominator is ten. Express. ($\frac{7}{10}$.)

I will express the same fraction. (0.7.)

Express one-tenth in this new way. (0.1.)

We call it the *decimal* way.

Express nine-tenths the decimal way. (0.9.)

Express two-tenths, four-tenths, five-tenths, six-tenths, eight-tenths.

Read what you have expressed as I point.

Express and add :

One-tenth, three-tenths, four-tenths.

Five-tenths, two-tenths, one-tenth.

Seven-tenths, one-tenth, zero-tenths.

Eight-tenths, zero-tenths, one-tenth.

Six-tenths, two-tenths, one-tenth.

Express and subtract :

Eight-tenths minus three-tenths.

Nine-tenths minus seven-tenths.

Seven-tenths minus three-tenths.

Nine-tenths minus six-tenths

Nine-tenths minus five-tenths.

Express and multiply :

Four-tenths by two.

Two-tenths by three.

Six-tenths by one.

Three-tenths by two.

Two-tenths by four.

One-tenth by seven.

Express and divide :

Eight-tenths by two-tenths.

Six-tenths by three-tenths.

Eight-tenths by four-tenths.

✓ Nine-tenths by three-tenths.

Six-tenths by two-tenths.

Express and find :

One-half of four-tenths; of eight-tenths; of six-tenths; of two-tenths.

One-third of six-tenths; of three-tenths; of nine-tenths.

One-fourth of eight-tenths; of four-tenths.

Read what I have expressed. ($32\frac{3}{10}$.)

Who will express the same number and write the fraction the decimal way. (32.3 .)

Write decimally :

Seven and six-tenths.

Six and five-tenths.

Eighteen and nine-tenths.

Twelve and seven-tenths.

Twenty and eight-tenths.

Fifty and one-tenth.

Three hundred and twenty-four and four-tenths.

Six hundred and thirty and two-tenths.

Express and add :

Eight-tenths, seven-tenths, five-tenths, four-tenths, seven tenths, three-tenths.

Six-tenths, nine-tenths, eight-tenths, five-tenths, seven-tenths, four-tenths.

Three-tenths, seven-tenths, nine-tenths, three-tenths, six-tenths, two-tenths.

Eleven and three-tenths, five and seven-tenths, eighteen and nine-tenths, twenty and eight-tenths.

Express and subtract :

Seven and five-tenths minus seven-tenths.

Fifteen and three-tenths minus eight-tenths.

Twenty-five and two-tenths minus sixteen and nine-tenths.

Forty-two and five-tenths minus twenty and six-tenths.

Sixty-five and seven-tenths minus thirty and eight-tenths.

Express and multiply :

Eight-tenths by seven. Nine-tenths by eight.

Six-tenths by eight. Seven-tenths by nine.

Eight and seven-tenths by six ; by eight.

Twelve and five-tenths by fourteen ; by nineteen.

Express and divide :

One and eight-tenths by nine-tenths.

Twenty-seven and three-tenths by three-tenths.

Fifty-six and eight-tenths by eight-tenths.

Eighty-five and six-tenths by four-tenths.

Seventy-seven and five-tenths by five-tenths.

Ninety-eight and four-tenths by six-tenths.

§ 89. TENTHS AND HUNDREDTHS.

Name a fraction whose denominator is hundredths.

Express it on the board. ($\frac{17}{100}$.)

I will express the same fraction. (0.17.)

Read what I have expressed.

Express in this decimal way :

Eighteen-hundredths; twenty-four hundredths; fifty-two hundredths; seventy-four hundredths; sixty-nine hundredths; ninety-seven hundredths.

Read what you have expressed as I point.

Look at this number. (0.13.) When I hide the three so that you see only the point and one, what will you call the number you see? (0.1.) One-tenth equals how many hundredths? Thirteen-hundredths are how many more than one-tenth? Read the number then in tenths and hundredths.

Read in tenths and hundredths each of the number of hundredths you have just expressed on the board.

Read this number in tenths and hundredths. (0.04.) This number. (0.05.)

Express :

Seven-hundredths; eight-hundredths; one-hundredth; three-hundredths; two hundredths; six-hundredths; nine-hundredths.

Read what you have expressed.

Express and add :

Three-hundredths, eight-hundredths, nine-hundredths, five-hundredths, seven-hundredths.

Nine-hundredths, six-hundredths, five-hundredths, seven-hundredths, five-hundredths.

Sixteen-hundredths, seven-hundredths, thirteen-hundredths, thirty-six hundredths, four-hundredths, fifteen-hundredths.

Twenty-three hundredths, nineteen hundredths, seventeen-hundredths, eight-hundredths, forty-hundredths, fifty-hundredths.

Three and five-hundredths, seven and six-hundredths, nine and fifteen-hundredths, six and fifty-four hundredths, seven and sixty-three hundredths.

Express and subtract :

Nine-hundredths minus three-hundredths.

Seven-hundredths minus four-hundredths.

Fifteen-hundredths minus seven-hundredths.

Seventeen-hundredths minus nine-hundredths.

Forty-two hundredths minus twenty-eight hundredths.

Ninety-five hundredths minus sixty-seven hundredths.

Eight and seventy-two hundredths minus five and fifty-four hundredths.

Seven and eighty-three hundredths minus four and thirty-eight hundredths.

Seventy-two and ninety-four hundredths minus thirty-five and twenty-six hundredths.

Express and multiply :

Nine-hundredths by seven.

Eight-hundredths by nine.

Seven-hundredths by eight.

Twelve-hundredths by seven.

Fifty-seven hundredths by nine.

Seventy-eight hundredths by eight.

Nine and sixty-seven hundredths by forty-six.

Six and forty-nine hundredths by seventy-seven.

Express and divide :

Nine-hundredths by three-hundredths.

Twenty-seven hundredths by nine-hundredths.

Forty-two hundredths by seven-hundredths.

Fifty-six hundredths by eight-hundredths.

Eighty-seven hundredths by three-hundredths.

Ninety-six hundredths by sixteen-hundredths.

One and thirty-six hundredths by seventeen-hundredths.

One and seventy-six hundredths by sixteen-hundredths.

Express and add :

Seventy-five and eight-tenths, five and six-hundredths, three-tenths, eight and sixty-seven hundredths, nine-hundredths, seven and eight-tenths.

Fifty-nine and sixty-eight hundredths, seventy-seven and nine-hundredths, eighty-five and seven-tenths, ninety and six-hundredths, six and ninety-seven hundredths, eight-hundredths, nine-tenths, five, eighty.

Express and subtract :

Twenty minus seven-tenths.

Fifty minus eighteen-hundredths.

Sixty minus nine-hundredths.

Seventy and two-tenths minus nineteen-hundredths.

Seven-tenths minus sixty-seven hundredths.

Express and multiply :

Eight by seven-tenths.

Sixteen by nine-tenths.

Sixty-nine by eight-tenths.

Seven by nine-hundredths.

Eighty-seven by sixty-nine hundredths.

Five-tenths by seven-tenths.

One and seven-tenths by nine-tenths.

Two and eight-tenths by three and seven-tenths.

Seven and nine-tenths by eight and seven-tenths.

Express and divide :

Two by one-tenth.

Four by two-tenths.

Eight by four-tenths.

Twenty-seven by three-tenths.

Two-tenths by one-hundredth.

Six-tenths by three-hundredths.

Seven and two-tenths by eight-hundredths.

Thirty-seven and five-tenths by fifteen-hundredths.

Nine by eighteen-hundredths.

Seven by fourteen-hundredths.

Eight by sixteen-hundredths.

Five and one-tenth by seventeen-hundredths.

Seven and two-tenths by twenty-four hundredths.

Express either in tenths or in hundredths :

One-half.

One-twentieth.

One-fifth.

Three-twentieths.

Two-fifths.

Seven-twentieths.

Three-fifths.

Nine-twentieths.

Four-fifths.

One twenty-fifth.

One-fourth.

Twelve twenty-fifths.

Three-fourths.

One-fiftieth.

Find :

0.3 of 25.

0.06 of 76.

0.7 of 63.

0.09 of 89.

0.9 of 72.

0.03 of 80.

0.5 of 84.

0.05 of 100.

0.4 of 95.

0.06 of 100.

0.2 of 79.

0.06 of 200.

0.6 of 96.

0.12 of 450.

0.1 of 800.

0.16 of 325.

0.6 of 125.

0.25 of 484.

0.8 of 376.

$0.33\frac{1}{3}$ of 100.

0.9 of 284.

$0.66\frac{2}{3}$ of 100.

0.7 of 576.

$0.16\frac{2}{3}$ of 100.

Express as common fractions, and reduce to lowest terms :

0.5 0.2 0.8 0.08 0.04 0.12 0.16 0.50

0.4 0.6 0.02 0.06 0.05 0.15 0.25 0.75

Express :

Two dollars and thirty-six cents (\$2.36); twelve cents (\$0.12); one dollar and five cents; five dollars and one cent; three dollars and twenty-one cents; ten dollars and fifty cents; fifty dollars and ten cents.

Read what you have expressed.

Express and add :

Three dollars and twenty-five cents, one dollar and fifty cents, nine cents, thirty-six cents, five dollars and thirty cents.

Express and subtract :

Six dollars and fifty cents minus three dollars and thirty-two cents.

Eight dollars and eighty-two cents minus four dollars and forty-eight cents.

Five dollars minus two dollars and sixty-two cents.

Express and multiply :

Seven dollars and fifteen cents by seven.

Eleven dollars and four cents by four.

Eight dollars and ten cents by eight.

Express and divide :

Ten dollars and twelve cents by two.

Five dollars and twenty-two cents by three.

Ten dollars and eighty-four cents by five dollars and forty-two cents.

Three hundred and twenty-four dollars and eight cents by one dollar and seven cents.

Six hundred and fifty dollars and nine cents by one dollar and two cents.

Nine hundred dollars by eighty dollars.

CHAPTER XXXIX.

PERCENTAGE.

§ 90. PERCENTAGE.

Express on the board one-hundredth ; four-hundredths ; ten-hundredths ; twenty-hundredths ; twenty-five hundredths ; fifty-hundredths ; seventy-five hundredths.

What have you been expressing ?

I have a new name for a *hundredth*. I will write it.
(*per cent.*) What is it ?

One per cent is how many hundredths ?

Two per cent is how many hundredths ?

Eight per cent is how many hundredths ?

Fifty per cent is how many hundredths ?

One-hundredth is what per cent ?

Three-hundredths is what per cent ?

Fifteen-hundredths is what per cent ?

Read what you have written, giving the name *per cent*.

Write what you have read, using the words *per cent*.

Read these per cents, giving the name *hundredths* :

25 per cent.	60 per cent.	80 per cent.
40 per cent.	90 per cent.	2 per cent.
100 per cent.	200 per cent.	500 per cent.
$33\frac{1}{3}$ per cent.	$66\frac{2}{3}$ per cent.	$12\frac{1}{2}$ per cent.

Two per cent of fifty dollars is how many hundredths of fifty dollars ?

Two per cent of fifty dollars is how many dollars ?

Twenty-five per cent of eighty dollars is how many hundredths of eighty dollars?

Twenty-five per cent of eighty dollars is how many dollars?

Find five per cent of sixty; ten per cent of ninety; seventy-five per cent of twenty-four; sixty per cent of twenty; fifty per cent of one hundred and fifty.

If from a barrel holding 40 gallons of vinegar 15 per cent is drawn off, how many gallons are drawn off?

A salesman has 250 pieces of cloth. If 4 per cent of the number of pieces is imperfect, how many pieces are imperfect?

If of a flock of 300 sheep 3 per cent died, how many sheep died?

I have in my school building 350 children. If on a stormy day $14\frac{2}{3}$ per cent of the number is absent, how many are absent?

If of 50 words which you write 2 per cent is wrong, how many words are misspelled?

If I give you 25 examples to perform, and you have time for only 80 per cent of that number, how many do you perform?

I have a box containing 12 bunches of envelopes. If I use $16\frac{2}{3}$ per cent of the envelopes, how many bunches do I use?

If a man buys a house for \$20,000, and sells it for 100 per cent of its cost, for what does he sell it?

If you have 20 words to spell, and spell 100 per cent of them correctly, how many do you spell correctly?

If my watch cost \$50, and I sell it for 100 per cent of its cost, what do I gain?

If thread which costs 5 cents a spool is sold for 100 per cent of its cost, what is the loss per cent?

If a man sells a horse for 100 per cent of its cost, what does he gain?

What is 100 per cent of any number?

Any number is what per cent of itself?

If the price of a book is \$1.50, but the salesman deducts 2 per cent of the price, how much does he get for the book?

If I lend a man \$200, and he pays me 6 per cent of it for the use of it, how much money must he pay me when he settles the note?

If you go to school 75 per cent of the year, how many months do you have for vacation?

For what must cloth which cost a dollar a yard be sold to gain 1 per cent?

For what must apples which cost 12 cents a dozen be sold to gain 50 per cent?

For what must confectionery which costs 20 cents a pound be sold to gain 100 per cent?

For what must soap which costs 32 cents a cake be sold to gain 25 per cent?

A basket of wood which weighed 50 pounds stood out in the rain. When wet it was found to have gained 20 per cent in weight. How much did it weigh then?

A quantity of sugar which weighed 75 pounds was found to have decreased 40 per cent in weight by drying. How much did it then weigh?

Express in all the ways you can :

1 per cent.	5 per cent.	$16\frac{2}{3}$ per cent.
2 per cent.	$12\frac{1}{2}$ per cent.	20 per cent.
4 per cent.	$14\frac{2}{7}$ per cent.	25 per cent.

Here is a sign which we use instead of the words *per cent* ($\%$).

Express each of the above per cents on the board, using this sign.

In how many ways can you now express a per cent?

What kind of a fraction is a per cent?

Express each of these per cents in the form of a common fraction reduced to lowest terms :

25%.	$16\frac{2}{3}\%$.	100%.	8%.
20%.	75 %.	10%.	150%.
50%.	$12\frac{1}{2}\%$.	200%.	5%.

Express each of these numbers as a per cent :

$\frac{1}{2}$, $\frac{1}{4}$, $\frac{1}{5}$, $\frac{1}{10}$, $\frac{1}{20}$, $\frac{1}{25}$, $\frac{1}{50}$, 1, 2, 3, 8, $1\frac{1}{2}$, $1\frac{1}{4}$, $1\frac{1}{5}$, $1\frac{1}{10}$, $1\frac{1}{20}$, $1\frac{1}{25}$, $1\frac{1}{50}$, $\frac{3}{4}$, $\frac{2}{5}$, $\frac{3}{10}$, $\frac{7}{20}$, $\frac{8}{25}$, $\frac{7}{50}$, $1\frac{3}{4}$, $1\frac{2}{5}$, 1.

If you have 4 apples, and eat 2, what part of the number of apples have you eaten? What per cent have you eaten?

2 is what per cent of 4?

If you have 20 cents, and spend 10 cents, what part of your money do you spend? What per cent of your money?

10 is what per cent of 20?

A merchant has a piece of flannel containing 25 yards. If he sells $12\frac{1}{2}$ yards, what fractional part of the whole does he sell? What per cent of the whole does he sell?

$12\frac{1}{2}$ is what per cent of 25?

If it is 50 miles between two places, and you start from one of the places, and travel 25 miles toward the other, what part of the distance do you travel? What per cent of the distance do you travel?

25 is what per cent of 50?

If I teach 6 hours in the day, what part of the day do I teach? What per cent of the day am I employed in teaching?

6 is what per cent of 24?

If I use 18 sheets from a quire of paper, what part of the whole do I use? What per cent of the whole?

18 is what per cent of 24?

If I have four 5-cent pieces, and spend one of them, what part of my money do I spend? If I spend 3 pieces, what per cent do I spend?

5 is what per cent of 20?

15 is what per cent of 20?

If you have ten 2-cent pieces, and spend 2 of them, what part of your money do you spend? What per cent of your money do you spend? If you spend 5 of them, what per cent of your money do you spend?

4 is what per cent of 20?

10 is what per cent of 20?

If a man earns \$25 a week, and spends \$25 a week, what per cent of his earnings does he spend?

25 is what per cent of 25?

If a man sells a load of wood for \$15, which cost him \$15, what per cent of the cost is the selling price?

15 is what per cent of 15?

If you buy a knife for \$1, and sell it for \$1, what per cent of the cost is the selling price?

1 is what per cent of 1?

40 is what per cent of 40?

50 is what per cent of 50?

90 is what per cent of 90?

4 is what per cent of 4?

2 is what per cent of 2?

100 is what per cent of 100?

200 is what per cent of 200?

If a man buys shoes for \$5 a pair, for what must he sell them to receive a hundred per cent of their cost?

5 is 100% of what number?

If a man buys sugar at 8 cents a pound, for what must he sell it per pound to receive 100% of its cost?

8 is 100% of what number?

12 is 100% of what number?

25 is 100% of what number?

100 is 100% of what number?

A jeweller bought a pin for \$2, which was 50% of what he received for it. For what did he sell it?

2 is 50% of what number?

Ida spent 6 cents this morning, which was 50% of all the money she had. How much money had she?

6 is 50% of what number?

9 is 50% of what number?

50 is 50% of what number?

100 is 50% of what number?

200 is 50% of what number?

In your class there are 12 children, which is 25% of the whole number in the room. How many are in the room?

12 is 25% of what number?

A man gained 20 cents on a book, which was 25% of the cost of the book. What was the cost of the book?

20 is 25% of what number?

7 is 25% of what number?

9 is 25% of what number?

25 is 25% of what number?

50 is 25% of what number?

100 is 25% of what number?

In selling ladies' hose, a merchant lost 1 cent on a pair, which was 10% of the cost. What was the cost?

On a summer's day a pint of water evaporated from a tank. If this was 5% of the water in the tank, how much water was there in the tank?

At the top of our blackboard there is a strip 8 inches in width which is painted green. If this strip is 20% of the whole width of the blackboard, how wide is the blackboard?

If a man pays \$3 a month for milk, and this is 4% of the table expenses for the month, what are the table expenses for the month?

A man paid \$2 for the use of some money for one month, and this was 1% of the sum he borrowed. What sum did he borrow?

2 is 4% of what number?

5 is 5% of what number?

1 is 2% of what number?

1 is 1% of what number?

8 is 10% of what number?

7 is 20% of what number?

I bought a book-case for \$15, and sold it for \$18. What per cent did I gain?

There were 20 children in the class at the beginning of the term, but there are only 15 now. What per cent of the class has dropped out?

A man who buys apples at 2 cents sells them at 3 cents. What per cent does he gain?

If bananas cost 4 cents, and sell at 7 cents, what is the per cent of gain?

If envelopes cost 6 cents a bunch, and sell for 12 cents a bunch, what is the per cent of gain?

If cloth which costs \$1 a yard sells for \$1.05, what is the per cent of gain?

If goods which cost \$100 sell for \$75, what is the per cent of loss?

If a man puts \$1000 into business at the beginning of the year, but finds at the end of the year that he has but \$800, what is his per cent of loss?

If 75% of gun-powder is saltpetre, what per cent of the whole is the rest of the mixture?

If 25% of a barrel of oil is drawn off, what per cent is left in the barrel?

If a man loses 10% in weight, what per cent of his former weight is his present weight?

If I spend 90% of my income for the year, what per cent of my income do I save?

If only 50% of grape wine is pure juice of the grape, what per cent is adulteration?

If coffee is adulterated 15%, what per cent is pure coffee?

If to reduce the strength of vinegar I put water with it so that 85% only is vinegar, what per cent is water?

If 70% of the rock in New England is granite, what per cent is not granite?

If in a mixture of green and black tea 30% is green tea, what per cent is black tea?

If a man sells goods at 120% of the cost, what per cent does he gain?

If goods are marked down to 75% of their cost, what per cent of the cost is the reduction?

§ 91. COMMISSION AND BROKERAGE.

I wish to hire you to sell some fruit for me, and this is the bargain I will make with you:

You shall receive 2% of the amount of money you bring me from the sale of the fruit.

If you sell 20 crates of peaches, at \$2.50 a crate, what will you receive for your wages?

If you sell 1000 boxes of grapes, at 20 cents a box, what shall I pay you?

How much will you receive for selling:

100 barrels of apples, at \$2 a barrel?

5 dozen apricots, at 15 cents a dozen?

10 dozen oranges, at 3 cents an orange?

40 boxes of raspberries, at 25 cents a box?

80 boxes of strawberries, at 15 cents a box?

20 dozen bananas, at 2 cents each?

Do you know of any one who works on this plan?

When any person is engaged to work for another on these terms, we call him a *commission agent*.

The money which he receives is called his *commission*.

You sold fruit for me on a commission.

I will make you my agent to sell other goods on a commission.

If you sell \$1500 worth of butter, at 4% commission, what shall I pay you? What shall I receive for the butter?

If you sell \$500 worth of boots and shoes, at a commission of 3%, what shall I receive for the goods?

If you sell \$350 worth of books, at a commission of $2\frac{1}{2}\%$, and pay \$5 for freight on the books, what shall I receive from the sale of the books?

What ought you to receive for buying \$900 worth of goods for me, at a commission of $1\frac{1}{2}\%$?

If an agent buys \$2550 worth of fruit, at a commission of $3\frac{1}{2}\%$, what does he receive for his work?

If an agent sells 25 sewing machines, at \$40 each, and receives a commission of $1\frac{3}{4}\%$ besides his expenses, which are \$50, how much does the owner receive from the sale of the machines?

An agent received \$3000 to invest in flour, at \$5 a barrel. How many barrels could he buy after deducting his commission of 2%? For what must the merchant sell the flour per barrel so as to receive 100% of the cost? For what must he sell the flour so as to gain 20% of its cost?

If a man sells a house for me for \$1000, what do I receive of the amount if his commission is 4%? If, besides my agent's commission, I pay \$25 for advertising, what has it cost me to sell my place?

An agent sold 5000 pounds of cotton, at 10 cents a pound. After deducting his commission of $2\frac{1}{2}\%$, what amount of money had he which belonged to his employer? He bought cotton cloth with this money, and received $2\frac{1}{2}\%$ commission for buying. After deducting his commission for buying, how many yards of cloth, at 6 cents a yard, did he buy with the sum that remained?

§ 92. INTEREST.

A man offers to take you as a partner in his business if you will contribute \$1000 to the capital already in the business. You have but \$500, so you decide to borrow the other \$500. Can you have the use of that money for nothing? What do you think you must do about it? You are right: you must pay for the use of it. I will say you pay \$30 for the use of it. Who knows what name we give to the sum you pay for the use of the money? What *interest* do you pay on the \$500?

What do you mean when you say you pay \$30 *interest*?

When you borrow this money, the man of whom you borrow does not say, "I will lend it to you for \$30"; he says, "I will lend it to you at 6% interest." What is the interest on \$500, at 6%?

Suppose you have to pay 7% interest on \$500, to what will the interest come?

To what will it come if you have to pay 5% interest? 9% interest? 4% interest? 3% interest? 8% interest?

If at 6% you pay only \$30 for the use of \$500, do you know how long you have a right to keep the money?

You are right: you can keep it but 1 year. Rate of interest is usually reckoned by the year.

What must you pay if you keep the \$500 2 years? 3 years? 4 years? 5 years? $\frac{1}{2}$ of a year? $\frac{1}{3}$ of a year? $\frac{2}{3}$ of a year? $\frac{1}{4}$ of a year? $\frac{1}{6}$ of a year? 6 months? 4 months? 2 months?

The amount of interest which you must pay on \$500 depends upon two conditions. Can you name the two conditions?

At 6%, what is the interest on \$250 for 2 years? for $\frac{1}{2}$ of a year? for 3 months? for 3 years and 6 months? At 7%, what is the interest for the time mentioned in each case? Find the interest at 5%.

Find the interest of :

1. \$150 for 2 years 6 months, at 6%.
 2. \$310.60 for 3 years 4 months, at 6%.
 3. \$60.25 for 4 years 2 months, at 7%.
 4. \$100 for 6 years 6 months, at 8%.
 5. \$420 for 6 months, at 5%.
 6. \$550.50 for 1 year 3 months, at 8%.
 7. \$836.75 for 2 years 4 months, at 6%.
 8. \$740 for 3 years 2 months, at $4\frac{1}{2}\%$.
 9. \$860.40 for 6 years 4 months, at 6%.
 10. \$999.95 for 1 year 9 months, at 6%.
 11. \$275 for 4 months, at $7\frac{1}{2}\%$.
 12. \$350 for 4 years 8 months, at 6%.
 13. \$200.50 from Nov. 19 to March 19, at 6%.
 14. \$600 from July 3 to Jan. 3, at 8%.
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If you keep \$500 one year, at 6% interest, what amount of money must you pay when you settle the note? If you keep the money 2 years, and make no payments of interest during the time, what amount must you pay when you settle the note?

To what will \$300 amount in 4 years, at 6% interest?

To what will \$120.25 amount in $3\frac{1}{2}$ years, at 7% interest?

To what will \$2000 amount in 5 years, at 4% interest?

How do you find the amount when you know the interest?

What do you mean by *amount*?

The sum of money which is borrowed has a particular name. Can you tell me what it is? It is called the *principal*.

Name the principal in the examples I have just given you to perform.

Which requires less time, to find the interest or to find the amount of any principal?

Which is the greater sum?

Find the amount of:

1. \$50 for 3 years 2 months, at 6%.
2. \$35 for 4 years 6 months, at 7%.
3. \$90 for 1 year 3 months, at 6%.
4. \$125 for 2 years 8 months, at 6%.
5. \$375 for 6 years 9 months, at $4\frac{1}{2}\%$.
6. \$480 for 5 years 3 months, at 8%.
7. \$720 for 7 years, at 4%.
8. \$650 for 8 years 4 months, at 6%.
9. \$300 for 2 years 2 months, at 6%.
10. \$525.50 for 1 year 9 months, at 6%.
11. \$250 from Jan. 1, 1880, to July 1, 1886, at 6%.
12. \$125.25 from March 3, 1882, to Oct. 3, 1884, at 6%.
13. \$75.75 from May 10 to Sept. 10, at 6%.
14. \$85 from Oct. 24 to April 24, at 6%.
15. \$90.25 from Dec. 20 to Sept. 20, at 7%.
16. \$70.75 from May 1 to Jan. 1, at 8%.

I paid \$24 for the use of \$200 for 2 years. I want you to help me find the rate of interest. If I paid \$24 for 2 years, what was the interest for 1 year? (\$12.) \$12 is what part of \$200? ($\frac{3}{50}$.) $\frac{3}{50}$ equals what per cent? (6%.) What then was the rate of interest?

Could you have found what per cent 12 was of 200 without reducing the fraction?

I paid \$63 interest on \$350 for 3 years. Can you find the rate of interest? What was the interest for 1 year? (\$21.) 21 is what per cent of 350? (6%.) What rate of interest did I pay?

If the interest on \$200 for 6 years is \$84, what is the rate per cent? For what time will you find the interest on the principal first? What will you do next? What is your answer? (7%.)

The interest on \$500 for 6 months is \$20. I wish to know the rate per cent. What is the interest on the principal for 1 year? (\$40.) 40 is what per cent of 500? (8%.) What is the rate of interest?

Find the rate per cent :

1. When the interest on \$50 for 2 years is \$6.
2. When the interest on \$405.25 for 1 year is \$16.21.
3. When the interest on \$600 for 4 years is \$120.
4. When the interest on \$425.25 for 6 months is \$17.01.
5. When the interest on \$375 for 4 months is \$7.50.
6. When the interest on \$25 for 1 year is \$2.
7. When the interest on \$75.50 for 10 years is \$30.20.
8. When the interest on \$100 for 1 year is \$3.
9. When the interest on \$200 for 6 months is \$3.
10. When the interest on \$50 for 2 years is \$3.
11. When the interest on \$450 for 3 years is \$60.75.
12. When the interest on \$600 for 3 months is \$9.
13. When the interest on \$1000 for 1 year is \$60.
14. When the interest on \$850 for 2 years is \$102.
15. When the interest on \$725.50 for 9 months is \$43.53.
16. When the interest on \$300 for 8 months is \$12.

I borrowed \$600, at 5% interest. If the interest amounted to \$60 for the time I kept the principal, can you tell me how long I kept it? You may first tell me what would be the interest on \$600, at the given rate, for 1 year. (\$30.) If the interest for 1 year is \$30, how many years will it require to make the interest \$60? (2 years.) How long then did I keep the principal?

If the interest on \$25, at 8%, was \$4, how long was the principal on interest? What will you first find? Having found the interest for 1 year to be \$2, what will you do to find how many years the principal was on interest to gain \$4?

The interest on \$425.25, at 8%, was \$51.03. How long was the money on interest? What was the interest for 1 year? (\$34.02.) How long then was the money on interest to gain \$51.03? ($1\frac{1}{2}$ years.)

A man paid \$60.75 for the use of \$450, at $4\frac{1}{2}$ % interest. How long did he keep the principal? For what length of time will you first find the interest? What then will you do to find the time?

Find the time in which :

1. The interest on \$200 will amount to \$30, at 6%.
2. The interest on \$275.50 will amount to \$38.57, at 6%.
3. The interest on \$475 will amount to \$99.75, at 7%.
4. The interest on \$500 will amount to \$82.50, at $4\frac{1}{2}$ %.
5. The interest on \$60 will amount to \$168.55, at $7\frac{1}{2}$ %.
6. The interest on \$100 will amount to \$22, at 6%.
7. The interest on \$50 will amount to \$40, at 8%.
8. The interest on \$1000 will amount to \$975, at $7\frac{1}{2}$ %.
9. The interest on \$850 will amount to \$136, at 6%.
10. The interest on \$700 will amount to \$70, at 5%.

11. The interest on \$625.25 will amount to \$75.03, at 4%.
 12. The interest on \$575.50 will amount to \$17.26½, at 6%.
 13. The interest on \$350.50 will amount to \$12.22, at 8%.
 14. The interest on \$75.50 will amount to \$20.74, at 7%.
 15. The interest on \$90 will amount to \$4.50, at 7½%.
 16. The interest on \$900 will amount to \$54, at 6%.
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I kept a sum of money 2 years, and paid \$6 interest at 6%. I want you to tell me what the sum was. You may first tell me what I should pay for \$1 for the given time at the given per cent. (12 cents.) If \$1 gained 12 cents, how many dollars must I have had to gain \$6 interest? (\$50.)

A certain sum of money produced \$99.75 in 3 years, at 7%. Let us see if we can find the sum. What would \$1 produce in the given time at the given rate? (21 cents.) If \$1 produced 21 cents, what sum was required to produce \$99.75? (\$475.)

What sum of money must I put in the bank that in 10 years will produce \$600, at 6%? What will you first find? Having found that \$1 for the given time at the given rate produces 60 cents, how will you find what sum will produce \$600 in the same time at the same rate? What sum do you find? (\$1000.)

Find the principal that :

1. Will produce \$24 interest in 3 years, at 4%.
2. Will produce \$45 interest in 2½ years, at 6%.
3. Will produce \$17.50 interest in ½ year, at 7%.
4. Will produce \$84 interest in 2½ years, at 6%.

5. Will produce \$128 interest in 4 years, at 8%.
 6. Will produce \$31.50 interest in 9 months, at 6%.
 7. Will produce \$22.50 interest in 3 years, at $7\frac{1}{2}\%$.
 8. Will produce \$35 interest in $1\frac{1}{4}$ years, at 8%.
 9. Will produce \$75 interest in 2 years, at 5%.
 10. Will produce \$231 interest in 7 years, at 4%.
 11. Will produce \$297 interest in $5\frac{1}{2}$ years, at 6%.
 12. Will produce \$13.75 interest in 1 year, at $5\frac{1}{2}\%$.
 13. Will produce \$8 interest in $\frac{2}{3}$ year, at 8%.
 14. Will produce \$51.25 interest in $3\frac{1}{8}$ years, at 6%.
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Just a year ago to-day I put a sum of money in the bank, at 6% interest. That sum now amounts to \$106. I want you to find what sum I put in the bank. If I had put in \$1, what would it have amounted to? (\$1.06.) If \$1 would have amounted to \$1.06, can you not tell what sum I must have deposited to amount to \$106? (\$100.)

I have just deposited a sum of money in the bank, at 6% interest. If it remains there $2\frac{1}{2}$ years, it will amount to \$230. What is the sum of money which I have just deposited? (\$200.)

If to-day you put out, at 7% interest, a sum which in 3 years will amount to \$363, what is the sum at interest? (\$300.)

What sum in 3 years and 4 months, at 9% interest, will amount to \$325? (\$250.)

When John was 5 years old, his father put a sum of money in the bank for him, at 6% interest. When he was 12 years old, the sum had amounted to \$213. What was the sum deposited? (\$150.)

If, at the age of a year and four months, a sum of money was put at interest for me at 6%, and when I was 18 years old it had amounted to \$1000, what was the sum? (\$500.)

Henry has a sum of money given him on his fifth birthday, which he lent to his father, at 6% interest. In 16 years 8 months it had amounted to \$10. What was the sum given him? (\$5.)

If to-day I invest a sum of money in railroad bonds, at 7% interest, which will amount to \$745 in 7 years, can you tell me the sum I invest? (\$500.)

A man has a sum of money invested in mortgages which yield him 1% a month. If in 8 years 4 months the sum amounts to \$2000, what is the sum invested? (\$1000.)

If you have a sum of money invested in government bonds which yields you 5% interest, and in 5 years it amounts to \$1000, what is the sum invested? (\$800.)

Find the principal that will amount :

1. To \$868 in 4 years, at 6%.
2. To \$1083 in 3 years 6 months, at 4%.
3. To \$555 in 5 years 4 months, at 9%.
4. To \$795 in 9 months, at 8%.
5. To \$918 in 2 months, at 12%.
6. To \$404 in 3 months, at 4%.
7. To \$598 in 8 months, at 6%.
8. To \$4000 in 12 years 6 months, at 8%.
9. To \$2000 in 16 years 8 months, at 6%.

